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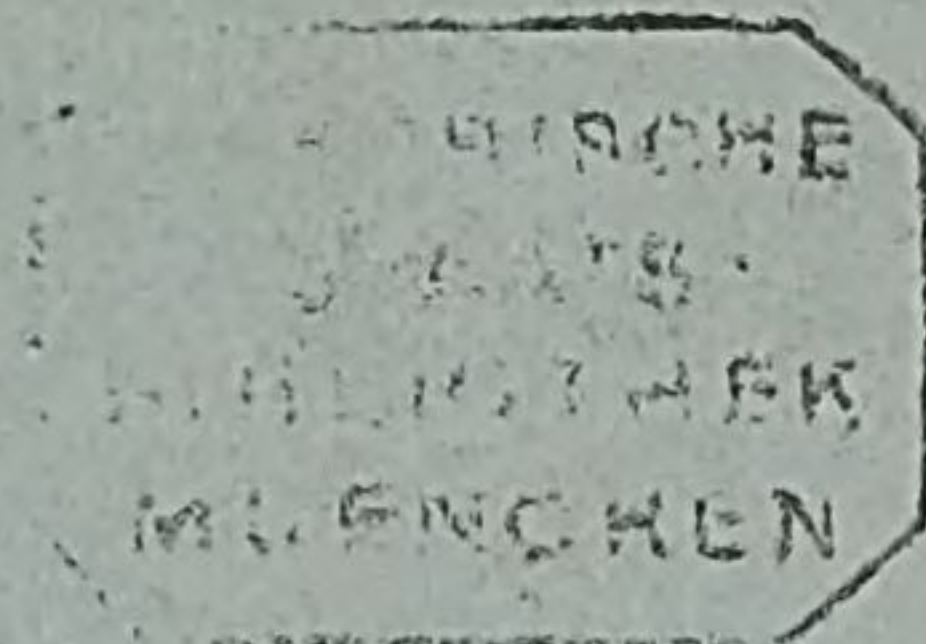
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THE
INDUSTRIES OF RUSSIA



MANUFACTURES AND TRADE

WITH A GENERAL INDUSTRIAL MAP

BY THE

DEPARTMENT OF TRADE AND MANUFACTURES MINISTRY OF FINANCE

FOR THE

WORLD'S COLUMBIAN EXPOSITION

AT

CHICAGO

EDITOR OF THE ENGLISH TRANSLATION

JOHN MARTIN CRAWFORD

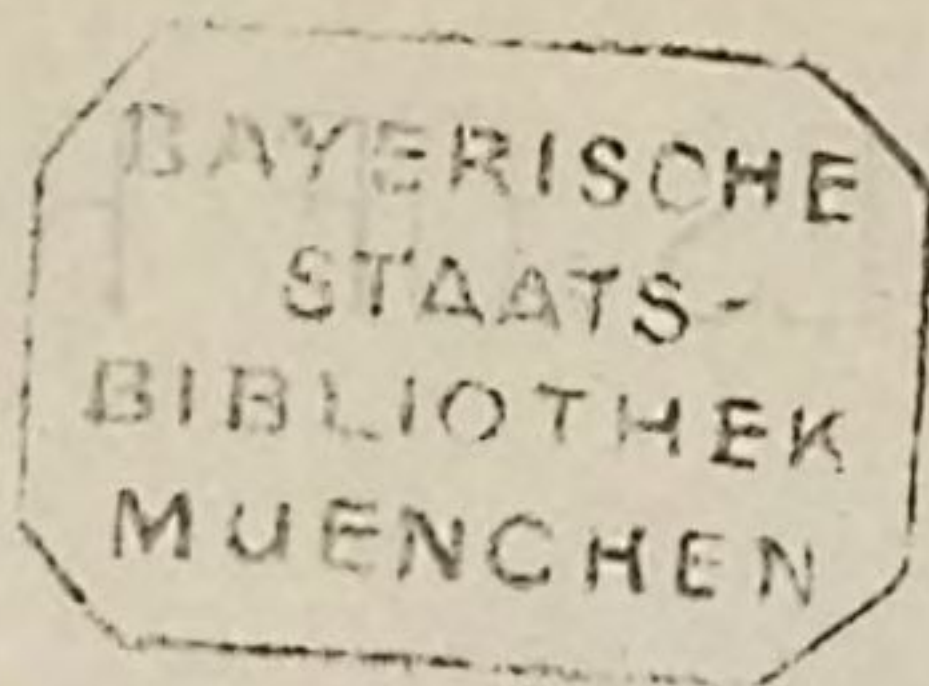
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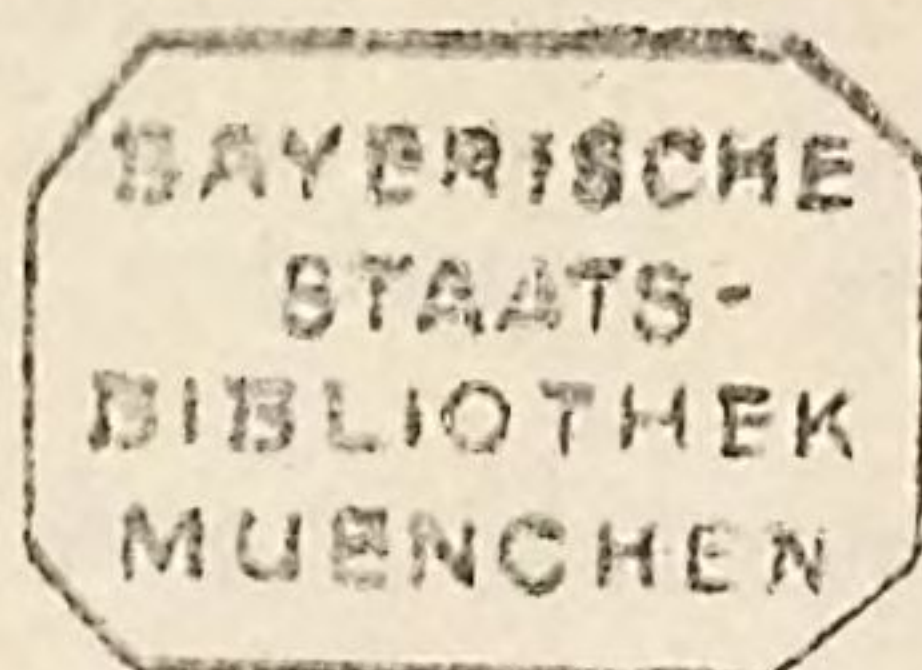
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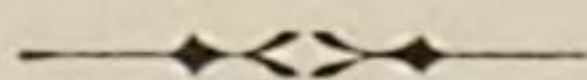
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CHAPTER XVII.

The Beet Sugar Industry.

THE beet sugar industry began in Russia almost simultaneously with its appearance in Western Europe, namely at the very commencement of the present century. The first beet sugar manufactory in Russia was built in 1802 by General Blankenagel in the village of Alabiev in the government of Tula, and received from the Government considerable support in the shape of a loan of fifty thousands roubles for twenty years made to the founder, to be paid off in sums of ten thousand roubles with interest during the last ten years. He also received permission to sell up to one thousand vedros of spirit obtained from beet sirup with no limitation as to price. Several other manufactories were established upon the same basis. But all of them were till the beginning of the thirties at a very low level of technical perfection; they possessed neither proper apparatus nor skilled workmen. Beet sugar manufactories were established exclusively by landowners and bore the character of an auxiliary article in the economy of great estates, as the cultivation of beet and the extraction of sugar therefrom appeared as an important element especially upon the estates of landowners. But until 1834 the output of these manufactories, on account of their extremely unsatisfactory arrangement was very inconsiderable. Moreover, they were employed not so much in the manufacture of sugar as in the distillation of spirit from beet molasses. Only since 1834 the production of the manufactories began to increase, with the appearance of sugar bakers acquainted with the process. At this time a Committee of Sugar Bakers was formed in the Moscow Agricultural Society, upon the proposition of the founder, Mr. Maslov. One of the sugar refiners, Davydov, there shewed his method of cold soaking of beet, which was destined to take the place of the squeezing out of the juice by means of presses. Soon afterwards, the clarification of beet juice by bullock blood was abandoned, and bone charcoal introduced in its place.

The spread of information upon the production of beet sugar and the improvement of the technical part of the business derived great advantage from such workers as Maltsev, Count Bobrinsky, Shishkov, Maslov and Davydov referred to above,

and a few others. At the same time a powerful impulse was given to the development of the beet sugar industry by the protective tariff to which the Government had recourse as early as 1825. The importance of this measure was greatly strengthened in 1841, when the bringing of colonial raw sugar by land was absolutely prohibited, and a duty of 3.80 roubles a poud imposed upon sugar brought by sea. The number of refineries increased every year and in 1844 and 1845 there were already 206 in operation in the Empire, while the quantity of raw sugar obtained by them amounted to 484,136 pouds, for the production of which 1,161,492 berkovets of beet were treated, answering to an average yield of 4.17 per cent, or about 16.7 pounds per berkovets.

Yet, however insignificant was the scarcely begun production, and however little it satisfied the home demand, a desire was expressed to establish a tax upon it. A proposition to this effect arose originally in 1839, and in 1841 it was presented in due legislative course, but was rejected by the Council of State. Afterwards in 1844 the same question was again raised in consequence of the agitation of the refiners who in view of the decreased import of colonial sugar petitioned at first for the lowering of the duty upon it. When subsequently, in 1847, the number of beet sugar manufactories exceeded 300, yielding as much as 800 thousand pouds of raw sugar, the refiners began, at the same time that they strove to exact the lowering of the duty upon foreign sugar, to insist upon the taxing also of sugar of home production. This tax was in fact established in 1848 in the form of an excise upon the quantity of raw sugar obtained in the beet sugar manufactories and the payment of licenses to run such manufactories. The quantity of raw sugar subject to excise was determined by legalized scales of its yield from the beet and by the production of the apparatus used for the obtaining of the juice in the twenty-four hours, and also by the number of working days in the factories. The scales of yield and work by the apparatus in twenty-four hours were taken very moderate, namely, 12 pounds of raw sugar per berkovets of beet that is, 3 per cent, the amount of excise being fixed at 30 kopecks per poud of estimated sugar, with continuous raising of the same every two years until September 1, 1854, by 15 kopecks, and with certain privileges for small and newly established manufactories. The payment for the right of carrying on the industry was fixed at 3 to 50 roubles a year, according to the quantity of raw sugar which the manufactory might be able to produce in the course of a hundred working days.

Simultaneously with the publication of the statute upon excise from home produced sugar in 1848, a special inspection of manufactories was instituted, whose duty it was to collect every kind of information and statistical data upon the beet sugar industry. Upon the basis of these data, during the period 1848, 1849, there were in twenty-three governments of the Empire, 340 works among which were 300 oven factories and only 40 were provided with steam. They treated 897,457 berkovets of beet and an estimated total of 269,234 pouds of raw sugar subject to excise. During the same period the importation of foreign sugar, raw and refined, amounted to 1,815,682 pouds. In the subsequent periods an increase took place both in the number of manufactories and in the quantity of beet sugar treated by them. During the period 1854 to 1855 there were already reckoned to be 395 manufactories, among which were 307 oven factories, and 88 steam. The quantity of beet treated by them was

estimated at 2,651,160 berkovets, and the normal production of raw sugar therefrom amounted to 795,561 pouds. The importation of foreign sugar was for the same period 1,130,442 pouds, 984,441 pouds of raw sugar and 144,001 pouds of refined. Simultaneously important advances were made also in the technical arrangement of the steam beet sugar manufactories, to which contributed among other things the establishment in the centres of the beet sugar industry of several machine works and the publication of guides to the industry.

In the next period of twenty-five years, 1855 to 1881, the situation of the beet sugar industry in Russia changed in all respects. It gained strength, developed and attained such dimensions that the country began to occupy a prominent position among the other countries of Europe, where the industry was earlier planted than in Russia. During the twenty-five year period under consideration, in the history of the beet sugar industry two epochs come prominently out, sharply distinguished from each other: the former was comprised between 1855 and 1864, and the latter from the last-named year. During the first period the number of manufactories, although increasing at first and reaching 432 in 1860, fell in 1864 to 402. The industry amounting to the annual treatment of 2 to 4 million berkovets of beet, was not so much a manufacturing as a rural industry. In 1861, following upon the peasant reform, came a crisis in the industry as in other spheres of activity, which resulted in the closing of several small rural manufactories and a certain decrease in the production. This crisis was however passed by the beet sugar industry in the course of only two years, and afterwards in 1864 to 1865 the manufactories began to become the enterprises of capitalists attracting men and means. The stock associations so formed, beginning with 1866, having collected considerable resources rapidly raised anew the beet industry, so that at the end of the period under consideration the oven manufactories were replaced by improved steam works. Compared with 307 oven manufactories at work in 1855 to 1856, there were in 1879 to 1880 out of a total of 199 only 4, and they were an improvement upon the previous system in that they worked with half-steam. At the same time the area occupied by beet plantations was extended. The treatment of beet root increased from 2,105,629 berkovets in 1855 to 1856 to 14,219,981 berkovets in 1879 to 1880, and the yield of sugar grew from 795,561 pouds, according to the established scale, to 12,544,628, according to the declarations of the sugar bakers. As a matter of fact the average amount of the annual production of sugar, according to the observations of the technical engineers of the Ministry of Finance, considerably exceeded the declarations of the sugar bakers and formed not less than 15,600,000 pouds. Native sugar not only finally drove out imported sugar but began to form an article of export.

While protecting the native beet sugar industry, the Government yet became convinced that the excise even as fixed at 60 kopecks a poud, as it continued to be levied till 1854, in no way expressed the actual tax falling upon the product in question. At the same time it appeared that the treasury suffered considerable losses also from the privileges granted in the payment of excise, in forms of new and recently established manufactories, while these same privileges, securing special advantages to the promoters, called forth the foundation of manufactories even in such localities where neither the conditions of soil nor climate in any way favoured the

establishment of the industry. Hence it was that the defects discovered in the statute of 1848 incited the Government to review the rules that were in force and to issue in the year 1863 a new statute. While preserving the fundamental principles of the system that had hitherto had force in taxing the beet sugar industry, the new statute introduced partial changes merely in respect to the two chief bases of the calculation, namely, the scale of production of sugar and the twenty-four hours work of the sirup-producing apparatus, with the object as far as possible of bringing these theoretical measurements into harmony with fact by means of raising those that had previously existed. In this way the average yield of raw sugar per berkovets of beet, according to the new statute was defined as of different amount according to the method of concentrating the beet sirup; in other words, when the concentration was effected by steam in an apparatus supplied with a vacuum the yield was defined as 6 per cent of the beet employed; when on the other hand, the concentration was effected without such an apparatus by the direct application of the fire combined with steam or only by steam, at 5 per cent; or finally, by concentration by fire alone at, 4.5 per cent. In reference to the appliances used in the production of sirup, besides a considerable raising of the scale for twenty-four hours work, new indications were adopted by which their productive capacity was to be determined in the calculation. At the same time scales were instituted for apparatus of which no mention at all was made in the former statute, namely, for the so-called centrifugal apparatus or turbines.

In consequence of the considerable raising of the scale used in estimating the production, which was fixed to remain in force till August 1, 1869, it was thought best to reduce the amount of excise, 60 kopecks per poud of raw sugar that had existed till then, and to levy from May 1, 1864 till August 1, 1866, 20 kopecks, and thereafter, 30 kopecks per poud. Moreover, the statute of 1863 absolutely abolished the privileges existing in reference to the payment of excise, which had been granted to newly built or rebuilt manufactories, and at the same time a special inspection of manufactories was established by the Government, consisting of 12 inspectors, a technical engineer and three other officials.

On August 1, 1867, came into force a rise in the excise to 50 kopecks per poud of raw sugar, with the condition that, if the revenue to the treasury from both imported and native sugar in 1868 and 1869 should not reach on an average, 6,500,000 roubles, from August 1, 1870 to August 1, 1872, the excise should be levied at 70 kopecks a poud.

Simultaneously with the raising in 1867 of the excise to 50 kopecks a poud, the distinction, existing till that period, in the taxing of the beet sugar industry in the Polish region and in the remaining partions of the Empire was abolished. This difference consisted mainly in the fact that the standard of the twenty-four hours yield of the sirup-producing apparatus for the Polish region was lower than in the other districts. By the rules of June 16, 1867, were established uniform standards and an identical amount of excise for the whole Empire.

As with the 50 kopecks excise the revenue to the treasury from the taxing of sugar of home production and from the duty upon imported sugar proved less than half the anticipated sum of 6,500,000 roubles, from 1870 the excise was raised to 70 kopecks per poud, but the standards defined by the statute of 1863 remained at the

same time unchanged till 1872, when they were raised in consequence of the fact that in the manufactories not only did the former apparatus act more advantageously, but diffusors were already in operation whose normal work was not yet determined.

By the law of June 10, 1872, it was laid down that if, with the excise of 70 kopecks a poud, the revenue from the taxation of home sugar and from the customs duties upon imported sugar should not reach an average for 1873 and 1874 of 4,400,000 roubles, for 1875 and 1876, 5,000,000 roubles and for 1877 and 1878 6,500,000 roubles, then from August of the year following each of these periods, the Minister of Finance, might raise the excise according to his discretion, but not to exceed 90 kopecks a poud. By the same law in the determination of the standards used in estimating, beyond the difference in the work of the various apparatus, the climatic and economical conditions of the localities of the industry were taken into account. In this way according to their situation all the governments where there were sugar manufactories were divided into three regions. To the first region were reckoned, the governments of Kiev, Podolsk, Volynia, Bessarabia and Poland; to the second, the governments of Kharkov, Poltava, Voronezh and parts of Kursk and Chernigov; to the third, all the remaining localities. In reference to arrangement, a distinction was established among the manufactories in respect to the more or less perfect extraction of the sirup and the perfection of the concentrating apparatus. Among the apparatus for the complete extraction of the sirup are reckoned especially all the appliances for soaking and diffusion; but at that time the most widely extended hydraulic presses were recognized as apparatus of less perfect extraction of the sirup, if they did not possess graters and soaking cylinders for the grating and soaking of the already once squeezed residue. Concentrating apparatus with vacuum were regarded as belonging to the class of improved appliances. Finally, manufactories were distinguished as factories proper and rural works. Among the latter were reckoned such as had not more than two hydraulic presses of accelerated action, or other apparatus whose total work corresponded to that of two such presses. The standards of yield from beet, according to the regions, the above indicated subdivision of manufactories and the degree of their perfection, were defined as follows: for the first region 7.5, 7 and 6.5 per cent; for the second 7, 6.5 and 6; and for the third 6.5, 6 and 5.5 per cent of the weight of the root. In reference to the principal sirup-producing appliances at that time, steam hydraulic presses and diffusors, the standards of twenty-four hours treatment of beet root were fixed for presses from August 1, 1872 till August 1, 1879, with a gradual rise after each three years, at 75, 85 and 105 berkovets; for diffusors, at 7 berkovets per 100 vedros of the cubic contents of the apparatus till August 1, 1875. Subsequently the standard for the diffusors was raised, first till August 1, 1876, to 13 berkovets, and then till August 1, 1879, to 16 berkovets per 100 vedros of contents.

In 1875 the excise was raised from 70 to 80 kopecks per poud of raw sugar. But in fact, the tax did not exceed 45 kopecks per poud, forming on an average 35 kopecks and even in individual cases not more than 20 kopecks, for the actual yield surpassed the fixed standards in manufactories provided with presses by nearly 202 per cent, and in those with diffusors, by 115 per cent. Hence in 1879 with a view to increase the revenue from the taxation of home produced sugar the standards were again raised on an average by 66 per cent, at the same time the calculation of

the 24 hours work of the apparatus was changed. In the case of hydraulic presses it was determined to calculate it according to the number of cubic foot of press space, as 11.13, 6.8, 6 and 3.43 berkovets per cubic foot in the 24 hours, taking account of the construction and rapidity of action of the presses. For diffusion was chosen as a unit, a capacity of 100 vedros of the whole diffuser battery, according to a special table, assigning to the said capacity a greater quantity of sliced beet, the less the dimensions of the separate diffusers; for example, with a capacity of 50 vedros, 30 berkovets; 100 vedros, 27.9 berkovets; 200 vedros, 25 berkovets, and so on. However, even with the establishment of new standards there again appeared a danger of diminished revenue because the sugar bakers hastened to introduce small diffusers even before the bill received the Imperial consent. Their production considerably surpassed that increase in the standard of their supposed work, compared with the large diffusers, which had been assumed by the law of May 15, 1879. Thus, by the introduction of small diffusers it proved possible to reduce the amount of excise paid 30 to 60 per cent, as compared with that under the former standards, so that a considerable percentage of sugar escaped the payment of excise.

Under a complete system of protection on the part of the Government, partly in the form of extremely favourable standards in the calculation of taxation, and partly in that of high customs duties upon imported sugar *, privileges of yet another kind were shown to the beet sugar industry, aiming at facilitating the export of the surplus of sugar on the home markets. Thus, in 1876 it was resolved to return the excise upon exported sugar at a nominal rate, that is, at 80 kopecks per poud, where as a matter of fact the excise then incident upon sugar proved in all, 20 to 25 kopecks a poud. In this way the draw-back, exceeding almost four times the excise actually paid by the sugar bakers, amounted to a high premium upon exportation. A consequence of this measure was a considerable increase in the export of sugar, which rose from 4 pouds in 1874 to 3,896,902 pouds in 1877, in consequence of which more than 3 million roubles of excise were returned as draw-backs, or almost half of the total excise then received by the treasury from sugar, namely, 6,616,048 roubles.

In reference to the production of sugar in the manufactories, the essential reform at the end of the period of twenty-five years under consideration resulted in a change in the processes adopted in obtaining sirup from the beet, namely, in the transformation of the majority of beet sugar manufactories from the press system to that of diffusers.

Out of the total number of 250 manufactories working during 1879 and 1880 already two-thirds were employing the diffusion process. With such successes in the technical part of the beet sugar industry, pursuing mainly one object only, the diminution of the excise payable by the manufactories, the equitable taxation of manu-

* Although by the law of June 2, 1872, simultaneously with the alteration of the standards of excise for sugar of home manufacture, it was decreed to levy upon foreign sugar during the six years period from 1873 to 1878 customs duties in a continually diminishing amount, namely, upon raw sugar, 2 to 2.50 roubles, and upon refined, 3 to 3.50 roubles per poud, with the object of regulating the prices of sugar upon the markets; nevertheless the lowest of these duties, 2 roubles and 3 roubles, proved so high that the importation of foreign sugar into Russia in 1878 was expressed by the insignificant quantity of 650 pouds.

factories of different kinds, which the law of 1879 had in view, alike in the interests of the treasury as in those of the sugar bakers themselves was disturbed.

In consequence of this, although it was determined, in order to save the beet sugar industry from fluctuation, to present the standards for calculating excise without radical changes during six years, 1880 to 1886, with only a slight raising of the standards of twenty-four hours work of hydraulic presses and diffusors for the period, August 1, 1883, to August 1, 1886, the Government found it necessary to have recourse to a radical alteration in the system of taxing beet sugar, by passing to the levying of excise upon the actual quantity of the article manufactured. This was achieved by the law of February 3, 1881, which directed that the excise upon sugar should be levied upon the quantity thereof as ascertained by weighing, at the following rate: from August 1, 1881 to August 1, 1883, 50 kopecks, and from August 1, 1883, to August 1, 1886, 65 kopecks per poud of raw sugar. The detailed regulations upon this subject were confirmed May 12, 1881, and put into operation on the 1st of August of the same year, throughout the whole Empire.

The essence of these rules consists in the following: the tax upon the sugar industry is composed as before of two kinds of duties, namely, that upon licenses giving the right to engage in the industry, and the excise proper upon the sugar manufactured; the calculation of the excise due to the treasury is based upon the quantity of sugar turned out by the manufactory as determined by weighing; in the case of beet sugar refineries where the obtaining of raw sugar and its refining are united in one building, or in buildings contiguous to each other, the excise is calculated by the weight of refined sugar and molasses in sugar loafs together with paper and string; the excise upon sugar in pieces is levied on the net weight. On the exportation of sugar the excise paid upon it is returned in full. The license duty on the right to carry on the industry is exacted at the rate of 5 roubles per thousand pouds of sugar manufactured.

The principles of the taxation of beet sugar established by the rules of May 12, 1881, remain in force at the present time. The subsequent exactments had in view: 1. the fixing of the amount of excise after July 31, 1886, which was done by the law of May 1, 1884, by which the amount of the excise was fixed for the period from August 1, 1886, to August 1, 1889, at 85 kopecks a poud, and from August 1, 1889 onwards, at the rouble a poud; at the same time it was enacted that every new rise of the excise above one rouble should be announced not less than two years in advance. The same law afforded certain privileges in the payment of excise for the first beet sugar manufactories that should be started in the regions of Turkestan, Transcaucasia and in Siberia; 2. the exportation of Russian sugar was encouraged by the temporary payment till July 1, 1886, of special premiums, over and above the draw-backs, upon exported sugar, at first at the rate of one rouble, and afterwards at that of 80 kopecks a poud. This was expressed in the acts of July 12th and November 9th, 1885, and March 30th, 1886. The same exactments provided that the premium paid for sugar exported up to July 1, 1886, to the European markets should be returned by the sugar bakers at the time of paying excise on sugar manufactured in 1885—1886, 1886—1887, 1887—1888, and 1888—1889 by being distributed over every poud of sugar manufactured during those periods in all the manufactories of the Empire; that the sugar exported from May 1, 1886,

till May 1, 1891, into Persia and into the Central Asian markets should enjoy a premium of 80 kopecks a poud without liability to be returned; and that on May 1, 1891, all payment of premiums should cease upon exported sugar; 3. the exchange in the dates assigned for the payment of excise was introduced by the law of February 20, 1889, by which instead of one such date for the payment of excise, the 31st of August, three dates were appointed, namely, June 1st, September 1st, and December 1st, of each year. Furthermore, by the laws of May 1, 1890, and of May 21, 1891, it was enacted that there should be a supplementary excise upon refined sugar and upon sugar prepared in a similar manner, at the rate of 40 kopecks a poud, and at the same time a special tax on licenses for beet sugar refineries of 5 roubles per 1,000 pouds of refined sugar manufactured by them. These two last laws came into force on September 1, 1892, but as on their practical application there appeared certain inconveniences, caused in the main by the insufficient exactness of the tests adopted for different kinds of refined sugar for distinguishing it from unrefined white raw sugar, the latter on account of its high quality hardly yielding to refined, by the latest law of January 12, 1893, it was exacted that the levying of the supplementary excise upon refined sugar should be abolished from September 1, 1894, and that the fundamental excise upon sugar should be raised from the same date to 1.75 roubles per poud.

Before passing to the review of the present condition of the beet sugar industry in Russia it seems appropriate to preface thereto a few of the more important statistical data upon the area of the land under beet cultivation, upon the crop and yield of the plant, upon the number of manufactories at work, upon the quantities of beet used by them and the estimated produce in sugar and the average yield of the same during the last decade, which has passed since the introduction of the system at present in force of taxing sugar.

THE AREA OF LAND UNDER BEET, ITS CROP AND YIELD.

Y E A R S.	Area of land under beet.	Total crop of beet in berkovets.	Yield per des- siatine in berkovets.
1881	223,132	22,063,091	96.5
1882	234,429	23,320,531	98.8
1883	276,131	22,183,955	80.3
1884	291,730	24,995,765	85.7
1885	299,574	34,088,171	113.8
1886	270,865	28,904,837	106.7
1887	231,064	26,292,453	113.8
1888	245,772	28,497,865	115.0
1889	247,641	26,925,773	108.7
1890	279,200	30,542,221	109.4
1891	281,140	26,608,113	94.7

THE NUMBER OF BEET SUGAR MANUFACTORIES IN ACTION, THE AMOUNT OF BEET USED, THE ESTIMATED PRODUCTION OF SUGAR AND THE AVERAGE YIELD.

Y E A R S.	Number of manufacto- ries.	Quantity of beet used, in berko- vets.	Quantity of esti- mated sugar, in pouds.	Yield of sugar per berkovets of beet.	
				Lbs.	Per cent.
1881—1882	235	21,529,965	15,936,714	29.72	7.43
1882—1883	237	22,897,190	17,537,890	30.68	7.67
1883—1884	244	22,149,000	18,759,739	34.40	8.60
1884—1885	245	24,631,238	20,958,120	34.32	8.58
1885—1886	241	33,669,974	29,039,594	34.32	8.58
1886—1887	229	28,734,639	25,949,631	36.52	9.13
1887—1888	218	26,068,419	23,749,028	36.48	9.12
1888—1889	220	28,046,827	28,393,327	40.08	10.02
1889—1890	220	26,703,226	25,606,372	36.64	9.16
1890—1891	223	30,199,018	28,475,431	38.92	9.73

From the extent of production and the value of the produce the beet sugar industry occupies now in Russia one of the most prominent places, the annual output of raw sugar alone, according to the data for the last five years, exceeding 25 million pouds, which at the mean value of a poud of this article, 4 roubles, places the value of the raw sugar industry alone at 100 million roubles. As far as concerns the quantity of sugar annually manufactured, Russia occupies the fourth rank among the other European countries, Germany, France, Austria, Belgium et cetera, where the beet sugar industry exists. At the same time this industry is in Russia in reference to technical matters on as high a level of development as in the countries mentioned, and the raw sugar produced in the Russian manufactories, differing little from refined sugar in its qualities and in the proportion of pure sugar, considerably surpasses in this respect the raw product of the foreign manufactories.

The governments of European Russia may be grouped into three regions according to the situation of the beet sugar manufactories: 1. *South-western*, including the government of Bessarabia, Kiev, Podolia, and Volynia, with the largest number of manufactories, forming about 52.4 per cent of the total number of the latter; 2. The *Central*, into which enter the governments of Voronezh, Ekaterinoslav, Kursk, Orel, Poltava, Samara, Tambov, Tula, Kharkov and Chernigov; these governments contain 29.1 per cent of the total number of sugar manufactories; 3. The *Polish*, containing the governments of Warsaw, Sedlets, Kalish, Petrokov, Liublin, Kelets, Radom, Lomzha and Plotsk with 18 per cent. Outside these regions there is one inconsiderable manufactory in Eastern Siberia, namely, in the government of Yeniseisk, established only in 1888, and which began to operate in 1889. The distribution of the 232 beet sugar bakeries and refineries working in 1890—91, according to regions, the area of land under beet cultivation, the crop of the latter, and the quantity of beet worked up by the manufactories were as follows.

REGIONS.	Manufactories.			Land under beet in dessiatines.			Beet in berkovets.	
	Sugar bakeries.	Refineries.	Total.	Manufactories.	Planters.	Total.	Received at manufactories.	Manufactured.
South-western . . .	110	7	117	55,562.1	98,759.2	154,321.3	17,657,784.3	17,609,223
Central	61	4	65	56,912.1	31,874.4	88,786.5	8,281,092.8	8,081,460.7
Polish	16	24	40	1,815.5	34,260.5	36,076	4,601,679.4	4,507,489.2
Eastern Siberia . .	1	—	1	16	—	16	1,665	845
Total . . .	188	35	223	114,305.7	164,894.1	279,199.8	30,542,221.5	30,199,018.2
For 1889—1890. .	186	35	221	106,402.8	141,238	247,640.8	26,925,773.3	26,703,225.7
Compared with 1890—1891, less by...	2	--	2	7,902.9	23,656.1	31,559	3,616,448.2	3,495,792.5

The average quality of the beet used, the quantity of sugar manufactured and estimated in the form of refined sugar, white and brown moist sugar, and refined treacle, and the yields of white sugar and black treacle corresponding to the beet treated were for the same period as follows.

REGIONS.	Average quality of beet sirup tested by polarization.			Quantity of estimated sugar.		Quantity of refined sirup.		Yield of beet per cent.	
	Sugar per cent.	Non-sugar per cent.	Quality.	Pounds.	Tons.	Pounds.	Tons.	White sugar.	Mollasses.
South-western . .	13.49	3.19	80.85	15,947,171.1	257,068.4	5,430.1	86.53	9.46	4.31
Central	13.63	3.64	78.94	7,575,750.7	122,121.1	3,529.2	56.89	9.47	4.24
Polish	14.81	2.57	85.20	4,952,438.7	79,833.3	29.7	0.48	11.28	2.12
Total, European Russia. . .	13.72	3.22	80.99	28,475,360.5	459,022.8	8,989.0	143.90	9.73	3.96
Eastern Siberia .	12.30	3.05	80.13	70	1.1	—	—	1.92	4.08
For 1889—1890, European Russia .	12.68	3.06	80.56	24,606,372	396,655	8,053.6	129.82	9.16	3.24

It appears from these data that the total area of the plantations under beet in 1890 formed 279,199.8 dessiatines (753,839.5 acres), or 31,559 dessiatines (85,209.4 acres) more than in 1889. The plantations connected with the manufactories formed 40.9 per cent of the total area, while the beet growers had 59.1 per cent. Among

In the separate regions the most unequal proportion of the two categories of plantations was in the Polish region, in which from a total area of 36,076 dessiatines (97,405.2 acres) the planters had 34,260.5 dessiatines (92,503.3 acres), that is, 95.1 per cent, while the manufactories had only 1,815.5 dessiatines (4,901.8 acres) or 4.9 per cent. In the South-western region the planters crops also predominated, but formed only 64 per cent of the total. In the Central region a quite different status is to be seen: here the plantations belonging to the manufactories predominate, occupying 64.1 per cent of the whole area under beet.

During the years 1882 to 1885 an almost unbroken expanse of the area of beet cultivation was observed, both in respect to the whole Empire and to individual regions. From 234,429 dessiatines (632,958.3 acres) in 1882, the area in question for the whole Empire grew to 299,574 dessiatines (808,849.8 acres) in 1885. This increase was in connexion with the favourable condition of the sugar market and the high prices ruling for sugar, which induced the sugar bakers to enlarge the area of cultivation and to increase the output of sugar. But from 1886 to 1889 in consequence of the standstill in the sugar trade and the insufficient demand for sugar, many manufactories considerably reduced both their own cultivation of beet and their orders for the same to the planters. This was reflected in a corresponding degree upon the area of beet plantations, which in 1886 was reduced to 270,865 dessiatines (731,335.5 acres) and in 1887 even to 231,064 dessiatines (623,872.8 acres), the most considerable reduction taking place in the South-western and Polish regions. In the following years the beet plantations began to be again gradually enlarged, reaching in 1888, 245,772 dessiatines (663,584.4 acres), in 1889, 247,641 dessiatines (668,628 acres), in 1890, 279,200 dessiatines (753,840 acres), in 1891 even 285,017 dessiatines (769,546 acres). Of the latter area there was left on September 1st, actually under beet, only 281,140 dessiatines (759,078 acres), among which belonging to manufactories were 117,369 dessiatines (316,896.3 acres) or 41.6 per cent, the remaining 163,771 dessiatines (442,181.7 acres), that is, 58.4 per cent belonging to planters.

The crop of beet in 1890, was 30,542,221.5 berkovets from 279,200 dessiatines (5,023,164.3 tons, from 753,840 acres), the average yield per dessiatine being 109.4 berkovets (6.66 tons per acre), while in 1889 each dessiatine gave on an average 108.7 berkovets (6.5 tons per acre). The highest yield was attained in the Polish region, namely, 127.6 berkovets per dessiatine (7.61 tons per acre), instead of 105.7 berkovets, or 6.31 tons, in 1889. Still lower was the result in the South-western region, 114.4 berkovets per dessiatine, or 6.83 tons per acre, while in 1889 the crop was 108.6 berkovets or 6.5 tons. The lowest yield of all was reached in the central region, where only 93.3 berkovets or 5.56 tons were obtained, while in 1889 the crop gave 110 berkovets per dessiatine or 6.56 tons per acre.

In 1891 the total crop of beet from 281,140 dessiatines (759,078 acres) was 26,608,113 berkovets (4,289,227.8 tons), consequently 3,934,108.5 berkovets or 634,178 tons or 13 per cent less than the crop of the previous year. The average yield per dessiatine was 94.7 berkovets (5.65 tons per acre), that is, 14.7 berkovets less than the crop of 1890.

From 1882 to 1890 the average crops of beet per dessiatine in each of the mentioned regions varied within the following limits: *a.* South-western region,

80.1 to 114.4 berkovets (4.78 to 6.83 tons per acre); *b.* Central region, from 73.2 to 125.3 berkovets (4.37 to 7.48 tons per acre); *c.* Polish region, from 88 to 127.6 berkovets (5.23 to 7.61 tons per acre).

According to its quality, that is, the proportion of sugar in the sirup and the composition of the latter, the beet crop of 1890 differed but little from that of the preceding year, as appears from the following data for all the three regions.

REGIONS.	1889—1890.		1890—1891.	
	Sugar.	Purity.	Sugar.	Purity.
South-western . . .	12.40 per cent.	80.11 per cent.	13.49 per cent.	80.85 per cent.
Central	12.34 > >	78.24 > >	13.63 > >	78.94 > >
Polish	14.94 > >	84.99 > >	14.81 > >	85.20 > >

Thus in both years Poland had the best beet, next following the South-western and Central regions. Moreover, in the preceding periods also, the same relation in reference to the quality of the beet existed between the said regions, that of the Polish region always standing first, followed by the South-western. The Central region ordinarily yielded by 5 to 6 per cent in the quality of the beet grown to the Polish region, and by 1 to 2 per cent, to the South-western governments. The only exception thereto was the beet of certain manufactories of the Kharkov and Kursk governments, which not only did not cede to that of Kiev, Podolian and Volynia but often even surpassed it.

The total yearly produce of the sugar manufactories at work in Russia in the beginning of the eighties attained 16 million pouds (257,920 tons), reckoning the actual yield of sugar from the beet. Russia thus occupied at that time in Europe the third place according to number of manufactories, and the fourth place in production. During the subsequent years the output of the Russian manufactories grew uninterruptedly till 1885—1886, when the production of sugar in the 241 manufactories then at work reached and even somewhat exceeded 29 million pouds (467,480 tons). From that time the production contracted to 26 million pouds (419,120 tons) and in 1887—1888, even to 23.7 million pouds (382,044 tons), the number of manufactories diminishing at the same time, first to 229 and then to 218. Afterwards, in the season 1888—1889, the dimensions of the output of the 220 manufactories then at work again increased, reaching 28,400,000 pouds (457,808 tons). In 1889—1890 there was however a fresh reduction in the production of sugar to 24,600,000 pouds (396,552 tons) in 220 manufactories, while in 1890—1891, as shown above, the 222 manufactories then working in European Russia produced even more sugar than in 1888—1889, namely, 28,475,000 pouds (459,017 tons). The results of the sugar-baking season, concluded in September 1892, shewed for 1891—1892 a total output upon 226 manufactories of 29,628,572 pouds (477,612.5 tons). This, taking into account the 26,255,612 berkovets or 4,232,404.6 tons of beet treated, corresponds to a yield of 45.08 pounds of sugar per berkovets, or 11.27 per cent.

Comparing the production of sugar for 1890—1891 directly with the number of manufactories in operation, it appears that to each manufactory there were 128,267 pouds (2,067.6 tons). As a matter of fact, however, the production of the manufactories was far from being so equally divided, proof of which is to be found in the following table, which gives the distribution of the manufactories according to the extent of their production in eight classes in each of the regions.

GOVERNMENTS.	EXTENT OF PRODUCTION OF SUGAR IN POUNDS.							Above 250 thous and.
	Up to 25 thous- and.	25—50 thous- and.	50—75 thous- and.	75—100 thous- and.	100—150 thous- and.	150—200 thous- and.	200—250 thous- and.	
South-western . . .	—	2	8	25	44	25	9	4
Central	2	11	6	10	19	11	1	5
Polish	—	2	4	7	16	5	5	1
Total.	2	15	18	42	79	41	15	10

From this table it is evident that on the whole, as also in each separate region, the manufactories of the fifth class predominated, with a production of 100 to 150 thousand pouds (1,612 to 2,015 tons), forming 35.4 per cent of the total number of manufactories. The second and third places belonged to the manufactories of the fourth and sixth categories, with a production of 75 to 100 thousand pouds (1,209 to 1,612 tons), 18.8 per cent, and from 150 to 200 thousand pouds (2,015 to 3,224 tons) 18.4 per cent. The next places were occupied by the manufactories of the third, second, seventh, eighth, and first categories, the last being the least, namely in all, 2 manufactories or only 0.9 per cent of their total number.

In regard to the sort of sugar manufactured by the sugar bakeries and refineries, that is, refined sugar, white and brown moist sugar, the first place in respect to quantity belongs to white moist, the output of which forms about 84 to 85 per cent of the whole. Next follows refined sugar, of which 12 to 15 per cent is manufactured in the refineries partly immediately from the beet root and partly by refining the raw sugar already estimated in the form of white or brown moist sugar; brown moist sugar forms only 0.1 to 2 per cent of the total estimated sugar. Thus, during the seasons 1889—1890 and 1890—1891, out of the total estimated sugar in all the manufactories amounting respectively to 25,286,810 pouds (407,623.3 tons) and 29,319,287 pouds (472,526.9 tons), there were manufactured, white moist sugar 21,334,369 and 24,737,650 pouds (343,910 and 397,771 tons), that is, in both seasons 84.3 per cent; refined sugar, 3,922,031 and 4,360,223 pouds (63,223.1 and 70,286.8 tons), that is, 15.5 and 14.8 per cent; and brown moist sugar, 30,410 and 221,414 pouds (490.2 and 3,569.2 tons), that is, 0.2 and 0.9 per cent. At the same time, as part of the white and brown moist sugar, estimated for the payment of excise to the amount of 680,438 pouds (10,968.6 tons) in 1889—1890, and 843,857 pouds (13,602.9 tons) in 1890—1891, was converted into refined sugar in the refineries and in the form of

refined sugar was subjected to a second estimate, the total quantity of sugar subject to the actual payment of excise amounted in 1889—1890 to 24,606,372 pouds (396,654.7 tons), and in 1890—1891 to 28,475,430 pouds (459,024 tons). The purified sirup in the refineries also enters into the number of saccharine products upon which excise is paid. Of this there was produced in 1889—1890, 8,053 pouds (129.8 tons), and in 1890—1891, 8,989 pouds (143.9 tons). Besides the said quantities of saccharine products manufactured in the sugar bakeries and refineries, the refined sugar made in the single special sirup refining works in the government of Volynia also enters into the estimate and is offered for sale. This manufactory, which will be referred to again below, uses not beet but black treacle or molasses together with raw sugar, obtained from the beet sugar manufactories. The production of this kind of sugar in the manufactory in question was, in 1889—1890, 376,815 pouds (6,074.2 tons), and in 1890—1891, 341,911 pouds (5,511.6 tons), there being used in the first case 162,436 pouds (2,618.4 tons), and in the second 118,870 pouds (1,916.2 tons) of bought raw sugar.

The yield per cent of white sugar from beet, in the beginning of the eighties not exceeding 7 to 8 per cent and at the present time, thanks to the improved processes of the sugar industry and also to the superior methods employed in the cultivation of the beet itself and the stricter sorting of the latter on acceptance at the manufactories, is seldom less than 9 to 10 per cent, or 36 to 40 pounds per 10 poud berkovets, taking all the regions together where the beet sugar industry exists. Thus for the ten consecutive seasons from 1881—1882 to 1890—1891 the yield of white sugar from beet was expressed for the whole Empire by the following figures in percentages of the weight of beet root:

Season 1881—1882	7.43 per cent.	1886—1887	9.13 per cent.
1882—1883	7.67 » »	1887—1888	9.12 » »
1883—1884	8.60 » »	1888—1889	10.02 » »
1884—1885	8.58 » »	1889—1890	9.16 » »
1885—1886	8.58 » »	1890—1891	9.73 » »

Taking different regions, these yields were distributed far from equally. The largest yields were always in the manufactories of the Polish region, dependening both upon the superior quality of the beet root and its stricter sorting on receipt at the manufactory and on the improved methods of manufacture, the more complete extraction of the sugar from the beet and the treacle, and in general more conscientious work. During the seasons indicated above these yields varied within the limits of 8.2 and 11.39 per cent, the yield in 1889—1890 forming 11.39 per cent, and in 1890—1891, 11.28 per cent. Corresponding to the high yields of white sugar in the manufactories of the Polish region were the low yields of black treacle or molasses, varying between 1.53 and 2.28 per cent, these yields during the last two seasons not exceeding 2.12 per cent by weight of the beet employed. Next to the manufactories of the Polish region, in regard to the yields of white sugar, followed those of the South-western region, in which the said yields fluctuated between the limits of 7.7 per cent and 10.48 per cent, the latter being in 1888—1889, while in 1889 to 1890 the yield was 8.91 per cent and in 1890 to 1891, 9.46 per cent. Finally in the central region the least yield was obtained in 1882—1883, 7 per cent, the

highest in 1890—1891, 9.47 per cent, while in the preceding season of 1889—1890, it was 8.68 per cent.

As for the yields of black treacle, they varied in the manufactories of the South-western region between 3.60 and 4.31 per cent, and in those of the Central region between 3.29 and 4.24 per cent. The cost of the manufacture per poud of sugar, being dependent upon the economical and technical conditions of the industry, the cost and qualities of the beet, the methods of production, the cost of materials, the amount of piece-wages, the expenses of management et cetera, is extremely variable in different manufactories and fluctuates within considerable limits. In general this cost, in proportion to the development and improvement of the industry, the diminution of the various general expenses, principally in the maintenance of the administration of the manufactory and of the workmen, the reduced expenditure of fuel, the improved culture of the beet, its stricter sorting, the application of more perfect ways of producing sugar et cetera, decreased gradually and in the period of 1889 to 1890 this cost was, for the greater part of the localities where beet sugar is produced, 2.22 to 3 roubles, not including the excise, and in the period 1884 to 1885 and 1885 to 1886 it amounted to 3.60 roubles, without excise. From 1890 to 1891 the cost of producing sugar decreased per poud, in the government of Kiev to 37 kopecks, of Volyn to 9 kopecks, and of Podolsk from 5 to 10 kopecks.

Turning to the technical side of the beet sugar industry, that is, to the methods and processes of extraction at the works, it is necessary to point out the means now in vogue for separating the juice from the solids, for purifying the juice, its evaporation and concentration and for treating the residues and molasses.

Until the close of the seventies the Russian beet sugar works chiefly extracted the juice by pressing the ground pulp of the roots in hydraulic and almost exclusively steam presses. Out of the 245 works, in action during the period 1877 to 1878, 156 works with 424 hydraulic presses, employed this process, while 81 out of the remaining 89, worked by diffusion, and the remaining 8 employed other more or less antiquated methods, such as screw presses, hot and cold soaking of the pulp, centrifugal machines and one factory employed Lebé's continuous acting rolling presses. Subsequently the diffusion process became more and more general, being considerably cheaper and giving a greater proportion of sugar from the beet. At the present time factories employing presses form a rare exception and those will doubtless also very shortly take to the diffusion process. Thus during the periods 1889—1890 and 1890—1891, only seven of the 220 and 222 sugar works in European Russia employed presses, of which there were 18 with 33 cylinders for soaking the pressed pulp. On the other hand during the period 1889—1890, 213 works with 2,721 diffusion vats employed the diffusion process, while in 1890—1891 there were 215 works with 2,792 diffusion vats of varying capacity, forming on the average 136.6 vedros (444 gallons) per diffusion vat during 1889—1890, and 138.4 vedros (449.8 gallons) during 1890—1891.

As regards the quantity of roots treated at the diffusion and press works, the former during 1889—1890 turned over 26,255,142 berkovets (4,232,329 tons) or 123,263.6 berkovets (19,870 tons) per factory; and during 1890—1891, 29,773,368 berkovets (4,799,467 tons) or 138,480.7 berkovets (22,323 tons) per factory. On the

other hand, the amount of roots treated at works employing presses in 1889—1890 was 448,084 berkovets (72,231.1 tons), that is, on the average 64,012 berkovets (10,318.7 tons) per factory; and during 1890—1891, 424,805 berkovets (68,478.5 tons) or 60,686 berkovets (9,782.6 tons) per factory. The purification of the juice attained by diffusion or pressure from the pulp or parings previous to being subjected to straining or saturation is now most usually by filtration alone in mechanical apparatus of various kinds. In some works the juice is purified chemically by means of sulphurous acid, instead of the usual means of saturation with carbonic acid. A mechanical filtration of the juice, purified by saturation, has also become more and more frequent, in as much as it makes a great saving in bone-black, which in many works is not used for passing the defacate juice, but only for purifying the sirups.

The chief improvement made in the process of evaporating the juice in boilers with exhausted air, consisted in enlarging the heating surface of the apparatus by transforming them from simple double acting, into triple, quadrupal and quintuple acting apparatus with a view of saving fuel.

During 1889—1890, there were altogether 352 evaporating apparatus at the 220 works in action, with 1,241 chambers having a total heating surface of 1,327,246 square feet; while during 1890—1891 the number of apparatus at the 222 works decreased to 345 with 1,240 chambers but the total heating surface had increased to 1,351,427 square feet.

As regards the boiling down of the sirup and residues the most recent improvements consisted in replacing the old concentrating apparatus with those of larger capacity and heating surface, with an arrangement for boiling the sugar residues with the steam from the evaporating apparatus.

With a view to hastening the treatment and decoloration of the residues the former centrifugal cylinders were replaced by new ones of larger dimensions with a greater capacity and various arrangements for diminishing the loss of sugar, for instance, by raking it through the bottom of the centrifugal cylinder and carrying it automatically to the drying ovens.

The steam power used at the sugar works has gradually increased with the installation of new boilers and engines. The total power of the works during 1889—1890 was given by 1,997 boilers of various systems, having a total of 112,715 horse power, and 2,570 engines of 33,520 horse power, while during 1890 to 1891, the number of boilers increased to 2,029 and their capacity to 127,221 horse power; the number of steam engines during the same period was 2,624 of 34,725 horse power.

Another important, if not so essential, improvement was the introduction of electric lighting in the works, thirty-eight of which were so lighted during 1889—1890 and forty-four, during 1890—1891.

The sugar works employ fuel of all kinds, namely, wood, coal, lignite, naphtha refuse and peat. Wood however is the predominating fuel and is used by most of the Russian works. As regards the extent of the consumption of wood fuel, it is far from uniform and varies between the wide limits of 10 and 20 cubic sages per 1,000 berkovets of beet treated. Next to wood, coal is the chief fuel and forms the principal combustible material of the Polish works. The remaining kinds of fuel,

lignite, naphtha refuse, and peat, are of only secondary importance and are only consumed in extremely limited amounts.

During the year 1889-1890 thirty-seven out of the sixty-one works in the government of Kiev used wood only, seventeen, a mixture of wood and coals, and seven, coals only, consuming altogether 86,045 cubic sages of wood, 2,837,804 pouds of coal and 583,398 pouds of lignite. After translating the two latter classes of fuel into their corresponding equivalents of wood (one cubic sagine of wood equals 120 pouds of Donets, 135 of Dombrovsk and 140 to 200 pouds of various other kinds of coal, and 460 to 500 pouds of lignite) it is seen that the total amount of fuel consumed corresponded to 109,655 cubic sages of wood, and as 7,457,822 berkovets of beet were treated, the consumption per 1,000 berkovets was on the average 14.7 cubic sages. During 1889-1890 naphtha fuel was employed at very few works, among which two sugar factories in the government of Samara consumed 1.57 and 1.34 pouds per poud of raw sugar produced. As the question of fuel is one of vital importance to the sugar industry, the search for means and methods of diminishing its consumption forms an object of continual care on the part of the owners of sugar works, and requires special attention to the economical construction of the boiler furnaces and to the improvement of the processes of boiling down and concentrating the juice.

One of the most important by-products of the beet sugar manufacture is molasses, which was formerly a positive burden to the sugar works subsequently it was used for fertilizing the soil, compost pits and partially as food for cattle. At the present time this product, which contains about fifty per cent of crystalline sugar, is used in considerable quantities in the manufacture of spirits. There are also various processes such as osmosis, elutriation and separation by strontium, by which the sugar contained in the molasses can be extracted. All these processes have been successfully applied in Russia at the beet sugar works themselves, or else, as in the case of the strontium process, at special works. During 1889-1890, the sugar was extracted from molasses by means of osmosis at eight works, with 102 osmotic apparatus, in the Central and South-western districts, and at twenty-four works with 193 apparatus in Poland.

During 1890-1891 the molasses was treated by this method at ten works having 125 osmotic apparatus in the central and South-western districts, and at twenty-four works having 206 apparatus in Poland.

Manury's elutriation process is adopted at three works: the Balakleevsk and Naboutovsk works in the government of Kiev and at the Uzefovsk works in the government of Warsaw. The first mentioned works treat daily up to seven hundred pouds of molasses of density from 38° to 41° Baumé, and containing about 50 per cent of sugar, the second works treat up to a thousand pouds containing 49.2 per cent of sugar, and the third, about 850 pouds containing about 58 per cent of sugar. The loss of spirit in treating the molasses by Manury's process does not exceed 0.6° per poud of molasses, and generally it is less. During 1889-1890 the total amount of molasses treated by this process at the above three works was 182,290 pouds (2,938.5 tons); and in 1890-1891, 248,438 pouds (4,004.8 tons) were treated.

Stephen's separation method was adopted by six works during 1888-1890 and 1890-1891. During 1889-1890, 520,676 pouds (8,393.3 tons) of molasses containing from

43 to 54.6 per cent of sugar of a purity of 58.8 to 68.6 per cent were treated. During 1890-1891, 559,441 pouds (9,018.2 tons) containing from 42.53 to 50.68 per cent of sugar of a purity from 59.06 to 64.5 per cent were treated.

In Russia the extraction of sugar from molasses by means of strontium is only carried on at the Zhitinsk molasses-refining works in the government of Volinsk. During 1889-1890 these works treated 494,672 pouds (7,974.1 tons) of black molasses containing 50.7 per cent of sugar of a purity of 64.67 per cent together with 162,146 pouds (2,618.5 tons) of raw sugar bought from other works. The yield of sugar from the molasses alone was estimated at 42.2 per cent. During 1890-1891, the same works treated 118,870 pouds (1,916.2 tons) of raw sugar and 501,178 pouds (8,079 tons) of molasses containing 50.73 per cent of sugar of a purity of 64.37 per cent and the approximate yield for the molasses alone was 43.6 per cent.

It will be seen from the above, that the extraction of sugar from molasses is making slow but sure progress in Russia. Thus during 1889-1890 there were forty-two works carrying on this industry, and in 1890-1891 this number had increased to forty-four.

The sugar industry occupies from eighty-six thousand to eighty-seven thousand persons, men, women and children. Thus, during the period 1890-1891, the total number of labourers occupied in the 223 works then in action, amounted to 86,681, distributed amongst the different sugar-producing regions in the following manner.

GOVERNMENTS.	№ of works.	NUMBER OF LABOURERS.				Average number per works.
		Men.	Women.	Children.	Total.	
South-western	117	40,483	4,055	287	44,825	383
Central	65	21,604	2,781	218	24,603	378
Poland	40	14,203	2,946	26	17,175	428
Eastern Siberia	1	40	30	8	78	78
Total	223	76,330	9,812	539	86,681	388

These data show that 86.06 per cent of the total number of persons employed in the sugar industry are men; then come women, 11.32 per cent, and then children, that is, labourers under fifteen years of age, 0.62 per cent. The percentage relation between these three classes of labour, in the three regions of European Russia is as follows.

GOVERNMENTS.	M e n.	W o m e n.	Children.
South-western	90.31 per cent.	9.05 per cent.	0.64 per cent.
Central	87.81 > >	11.31 > >	0.88 > >
Poland	82.69 > >	17.15 > >	0 16 > >

Thus, man labour greatly predominated in all the regions; the percentage of woman labour was highest in those regions where the number of factories was the least, and that of child labour, in the central region of Russia.

The monthly wages of the labourers employed in the sugar industry may be indicated as follows.

GOVERNMENTS.	M e n.	W o m e n.	Children.
South-western	5 to 10.50	3 to 8.00	
Central	5 „ 16.00	3 „ 10.50	4.50 to 9
Eastern Siberia	— „ 13.00	10 „ 40.00	5.20 —

These data prove that the wages were highest in the governments of central Russia and in eastern Siberia, and lowest in the south-western governments. Satisfactory data for the rate of wages in Poland are wanting.

During 1889—1890 and 1890—1891, there were seventeen special sugar refineries exclusively treating the raw sugar made at other works. The distribution of these refineries over the Empire and the extent of their yield was as follows.

GOVERNMENTS.	1889—1890.		1890—1891.	
	Nº of works.	Yield in pouds.	Nº of works.	Yield in pouds.
Kiev	4	3,400,348	4	3,591,112
Moscow	4	2,291,674	4	2,424,129
Kherson	1	2,282,003	1	2,039,893
Kharkov	2	1,869,691	2	1,601,381
Chernigov	2	1,419,481	2	1,520,417
St. Petersburg	2	1,166,652	2	1,165,946
Tula	1	884,314	1	862,683
Podolia	1	698,397	1	699,096
Total	17	14,012,560	17	13,904,657

Altogether, counting the refined sugar produced at the thirty-five sugar refining works treating their own and other raw sugar, and also the Zhitinsk molasses refinery to the amount of 4,298,846 pouds (69,297.5 tons) during 1889—1890 4,702,134 pouds (75,798.5 tons) during 1890—1891 and the total yield of refined sugar in Russia amounted to 18,311,406 pouds (295,179.9 tons) during 1889—1890 and 18,606,791 pouds (299,941.6 tons) during 1890—1891.

Taking the moderate price of four roubles per poud for raw, and five roubles per poud for refined sugar, it is found that during 1890—1891 the Russian sugar industry, for these two chief products only, realized a sum of about 189,494,000 roubles, and namely, the yield of the raw sugar works, 24,115,127 pouds (388,736 tons) having a value of 96,460,000 roubles and the sugar refineries, 18,606,800 pouds (299,941.6 tons) having a value of 93,034,000 roubles.

The following table gives an idea of the fluctuations in the price of raw sugar on the Kiev market during the last five years.

Y E A R S.	Minimum price.	Maximum price.
	R o u b l e s.	
1884—1885	3.80	5.15
1885—1886	3.05	5.00
1886—1887	2.99	3.97
1887—1888	4.22	4.50
1888—1889	3.90	5.00
1889—1890	4.15	4.60
1890—1891	4.00	4.50

In 1891 the price varied between 3.85 and 4.90 roubles per poud. The lowest price for refined sugar was 5.30 and the highest 5.50 roubles per poud.

The following table, showing the amount of sugar bought by the trade from the works, gives an idea of the consumption of sugar in Russia.

Y E A R S.	A M O U N T O F S U G A R.	
	Pouds	Tons.
1887—1888	21,324,065	343,744.0
1888—1889	22,145,587	356,986.9
1889—1890	22,790,772	367,387.1
1890—1891	23,265,996	375,067.9

According to these figures, and taking the population of Russia during these years at 115 to 118 millions, the consumption of sugar per capita would be from 7.4 to 7.9 pounds.

The exportation of raw and refined sugar from Russia during the last seven years is indicated below.

YEARS.	Raw sugar.	Refined sugar.	T O T A L.	IN THOUSAND OF TONS.		
	P o u n d s.			Raw sugar.	Refined sugar.	Total.
1885.	4,089,914	163,615	4,253,529	66	3	69
1886.	3,362,656	445,035	3,807,691	54	7	61
1887.	3,812,312	770,521	4,582,833	61	12	74
1888.	4,524,161	1,056,658	5,580,819	73	17	90
1889.	3,324,219	1,146,983	4,471,202	54	19	73
1890.	2,357,185	915,563	3,272,748	38	15	53
1891.	6,317,074	1,251,813	7,568,887	102	20	122

The export of sugar is most considerable across the European frontier, and is usually three or four times greater than that across the Asiatic. However, in 1890 an almost equal quantity was exported over both frontiers.

The importation of sugar, raw, refined and Chinese candy into Russia during the same years was very small and amounted to:

1885.	7,076 pouds	or 114.06 tons.
1886.	4,825 »	» 77.80 »
1887.	5,275 »	» 85.03 »
1888.	3,871 »	» 62.40 »
1889.	4,558 »	» 73.50 »
1890.	37,393 »	» 602.78 »
1891.	8,560 »	» 137.99 »

In conclusion, the following table gives the Government revenue from 1882 to 1891, levied upon the internal production in the form of excise, license and other taxes on the sugar industry.

Y E A R S.	Excise.	License and other taxes.	T O T A L.
	R o u b l e s.		
1882	7,962,258	92,789	8,055,047
1883	8,783,178	95,046	8,878,223
1884	12,252,953	142,811	12,395,764
1885	13,676,172	186,420	13,862,592
1886	14,862,877	996,303	15,859,180
1887	22,836,437	2,573,706	25,410,143
1888	16,892,511	2,554,204	19,446,715
1889	17,781,419	1,564,317	19,345,736
1890	21,463,390	165,915	21,629,305
1891	20,660,091	197,351	20,857,442

On September 1, 1892, as has already been mentioned, the excise upon raw sugar was supplemented by an excise of 40 kopecks per poud upon refined sugar, and as the total production of refined sugar is not less than eighteen million pouds per year, therefore this supplementary excise should bring in about 7,200,000 roubles. Besides this the sugar refineries and works pay a special license of five roubles per thousand pouds of refined sugar produced. With the above yearly production this tax will bring to the Government about 90,000 roubles additional income.



CHAPTER XVIII.

The distillation of spirits*.

THE manufacture of spirits, as dealing with the products of agriculture on the one hand, and as furnishing the farming industry with an excellent food for cattle in the form of malt, on the other hand, occupies for these reasons a predominating position among the agricultural manufactures. In Russia, mainly a farming country, this relation is particularly apparent. But beyond the importance which the manufacture of spirits has to Russia, for these reasons it also plays a salient part to the State as furnishing, in the form of excise dues, about one-third of the Government revenue.

HISTORICAL REVIEW OF THE GOVERNMENT MEASURES RESPECTING
THE ALCOHOLIC INDUSTRIES.

The use of corn spirit, called *vodka*, became known in Russia very soon after its appearance in Western Europe. In the sixteenth century there were already drinking houses in the towns, and in the seventeenth century the sale of wine, beer, and mead, and the distillation of alcohol for the purposes of sale, formed the exclusive right of the State, who either acted through their own agents, or else leased their right to private individuals. The spirit was either prepared at State distilleries, or at private works commissioned by the State, and was then sold in public houses kept on trust or leased. In the first case the sale was carried on by a person entrusted by the State, but not personally interested in the business, but in the second case the business was conducted by the farmer, who endeavoured by every means to increase the sale thereof, thereby greatly encouraging drunkenness. The distillation was at that time conducted in the most primitive manner. The works were exclusively oven distilleries, and the spirit was prepared exclusively from rye. Landowners were only allowed to

* For viticulture and wine making see Volume III, Agriculture and Forestry.

distill spirit for their personal use. The tavern keepers and lessees manufactured the State spirits in distilling and tavern yards, which had quite the appearance of small towns, surrounded on all sides by walls or wooden palings, with the necessary distillery and house buildings. There were similar establishments in all the towns and large villages, and the spirits were supplied from them to the markets and fairs, where temporary taverns were set up.

This system of the manufacture and sale of spirits by the State, or in other works, the alcoholic regalia, continued in force during the commencement of the reign of Peter the Great. In 1705, however, the spirit dues were rented out, and the former regime of these dues gradually modified, and at the close of the eighteenth century, totally abolished. At the same time, with a view to increasing the State revenue, the distillation itself was, already in the reign of Peter I. subjected to a moderate tax, which was levied to the amount of twenty-five kopecks upon each vedro of capacity of the stills. The extent of the spirit manufacture at the middle of the eighteenth century can be judged from the fact that the yearly capacity of all the distilleries was only 3,962,471 vedros. In 1781 the manufacture of spirit by the lessees was abolished and became the sole right of the State, who carried on the distillation at their own distilleries or by contract, the lessees being given only the right of sale at a price nominated by the State. The price varied between two and four roubles per vedro.

The stamping of the stills according to their capacity, and the tax imposed, were abolished at the same time. Then in 1795 the State again ceded some of its rights over the manufacture of spirits to lessees, who obtained permission to buy spirits direct from the distillers without the medium of the Government, being thereby placed under more favourable conditions. The price of spirits was raised to seven roubles per vedro, and the lessees holding the monopoly of the trade became rich, powerful and important personages. However, the alcohol trade was sorely oppressed by them, and the Government dues were so irregularly paid that in 1811 the arrears of the lessees had accumulated to thirty-seven million roubles. Hence in 1819 the State direction of the spirit trade was reinstated in the governments of Great Russia. The spirits were prepared by the Government at its own distilleries, or under contract at private works, who were once more obliged to deal solely with the State. The control over these distilleries was, however, limited to revisions by Government officials of the account books kept by the distillers. The distillation of spirits for home use was forbidden. The sale of spirit to private individuals was conducted by Government stores of which there was one in every town dealing in vedros. Besides this, in every town there were several drinking houses where spirits were retailed at a regular price per glass. The wholesale price was fixed at seven roubles per vedro, and an excise of six roubles per vedro was levied upon corn spirits.

The State direction did not, however, remain long in force. Immediately after its establishment the consumption of wine began to decrease rapidly, and in order to keep the spirit revenue from decreasing it was found necessary to raise the price of spirits to eight roubles per vedro. But this measure, combined with the increasing dishonesty of the salesmen, diminished the sale still more, and the excisable quantity fell from 18,545,531 vedros in 1819, to 11,956,797 vedros in 1825, and 12,088,318 vedros in 1826. Hence in 1826 the renting system was again adopted under almost the same

conditions as before. According to these conditions a certain proportion of spirits was manufactured by the State, and sold to the lessees at a fixed price approximating actual cost, while the spirits in excess of this proportion were acquired by the lessees independently of the State, as they might find most advantageous to themselves. The fixed selling price varied, according to the quality of the spirit, between eight and sixteen roubles paper per vedro. But subsequently, after converting the account into silver roubles, the price was determined at 3 to 6 roubles per vedro. The excise upon the spirit and all the other dues upon its sale were handed over to be collected by the lessee for his own use.

In order to prevent an illicit trade, the manufacture was subjected to a strict supervision and control on the part of the lessees, who were allowed to have their overseers at the distilleries for this purpose. Being endowed with such authority, they had the power of encouraging the spirit trade in one locality and of completely killing it in another, and at the same time of bringing a great pressure to bear, not only on the population of the locality leased by them, but also on the Governemental administration of that province, by which the interests of both the population and State suffered. For this reason the leasing system was in 1847 exchanged for the so-called excise-leasing commission system, which consisted in the following features: the collection of the excise dues was as before leased in separate districts or towns, with the difference that the lessee, who took upon himself the collection of these dues, became at the same time the commissioner for the sale of the spirit. Notwithstanding the seeming difference between this and the previous leasing system, there was really scarcely any essential difference between the two in practice. The spirit trade as before remained entirely in the hands of the lessees, who based their calculations mainly on the advantages accruing from the sale of the liquor itself, and the revenue from the collection of the excise dues was only a secondary consideration, and in some instances was exceedingly small. In the meanwhile the manufacture of spirits was completely separated from the agricultural interests, and carried on without the slightest regard to the latter. It most frequently bore an incidental character; in certain localities, where the manufacture of spirits might have been a support to agriculture, it was completely neglected, while it was encouraged in districts where a combination of favourable conditions of soil or industry excluded the necessity of such an auxiliary industry.

Such an abnormal condition of affairs could but attract the attention of the Government, which, almost immediately after the introduction of the excise-leasing commission system, began to seek for a more convenient mode of extracting the revenue upon spirits. But endeavours of this nature, in view of the then existing economic condition of the country, could not be realized, and the leasing method continued in force until January 1, 1863, when a radical reform was at last made in the mode of collecting the liquor dues, and the now existing excise system of collecting the revenues upon spirituous liquors was adopted.

As has been already mentioned, the leasing system, and also the excise-leasing commission system, were only in force in the governments of Great Russia. In the other portions of the Empire the legislative measures respecting the manufacture and the collection of liquor dues retained as far as possible the order in vogue before the union of these districts to Russia. Thus, in the governments in the district

of Novorossisk, Little Russia, the Crimea, and the north-western provinces, and in the towns and villages belonging to the State, the sale of spirits was at first conducted in State taverns, and afterwards the liquor trade was leased, the leases being termed *charochni*, signifying a little cup. At the same time the consumption of spirits was subjected to a special tax upon the manufacture of spirits, which, although fixed at from 70 kopecks to one rouble per vedro, in reality formed an assessed tax levied upon the population, fixing the consumption at one vedro per head per year. Notwithstanding the imperfect uniformity of the distribution of this tax, it gave a great freedom to the manufacture, owing to which the so-called privileged governments, formed from the above-mentioned districts, produced a great number of small distilleries belonging to separate landowners and greatly helping the income derived from their estates. Subsequently the above tax was replaced by an excise levied to the amount of 1.20 roubles per vedro of spirit manufactured for local consumption, and instead of the excise upon the drinking houses, in places enjoying free sale of spirit, a liquor tax was fixed considerably higher than the price of the former licenses.

In the Baltic provinces the liquor revenue was levied in the form of a distillery tax, at first of 60 kopecks, and subsequently of one to two roubles paper per vedro on the assumed consumption of one vedro per head per year, and also of a license tax upon drinking houses. In the towns a special liquor tax was levied, whose extent was determined by the Government for each town separately. In Poland the manufacture of spirits bore an entirely agricultural character, and until 1844 the production was not subject to any taxation. In 1844 an excise was placed upon the distillation of spirits, which until 1862 varied in proportion to the yield of the distilleries. But in 1862 it was changed, and a uniform excise of 34 kopecks per vedro was put upon spirits of 78° Tralles strength; this was subsequently raised to one rouble. Besides this excise, the towns in Poland paid a consumption tax determined upon the number of inhabitants in the towns which were divided into five classes according to the dimensions of the tax. Independently of these two forms of liquor taxation, there was another special tax for the propination licences for all persons participating in the manufacture and traffic of spirits.

And lastly in the other portions of the Empire, namely in Siberia, the Caucasus, and the province of the Don Cossacks, the modes of collecting the liquor revenues were more or less similar to those practised in Great Russia; only in the Don province the revenue did not go to the State but to the use of the Don Cossacks.

During the last years of the existence of the leasing system, that is, previous to the introduction of the excise system, the liquor trade of the Empire, not including Poland, was in the following position. In 1860 the governments of Great Russia included 723 distilleries, whose total possible yield was 113 million vedros of under-proof spirits, that is, of 38 per cent. Tralles, which on the average formed over 155,000 vedros per distillery. In reality far from all the distilleries were in work, so that their actual yield did not exceed 19 million vedros, or one-sixth of the full capacity.

The following figures show the number of distilleries of different possible capacities.

Under 10,000 vedros	35 distilleries
From 10,000 to 100,000 vedros.	371 »
» 100,000 to 500,000 »	259 »
Over 500,000 vedros.	58 »

Hence, large distilleries having an average capacity of 100,000 vedros were in the majority. In the privileged governments there were, in all, 4,437 distilleries, but many of them were also inactive. Distilleries having a yearly capacity from 2,000 to 10,000 vedros of underproof spirit predominated. The average yield was about 7,700 vedros per year.

The distilleries both of Great Russia and of the privileged governments were of the simplest construction. The crushing of the spirit-yielding material was conducted by means of hand beaters, or simple wooden stirrers moved by horse gins, and the distillation was in wooden stills requiring a large amount of steam. In the privileged governments the distillation was carried on by the landowners, chiefly as a means of using up waste products. In Siberia there were only three State distilleries, with a normal capacity of 1,800,000 vedros. In all the Baltic governments also small distilleries, with an average yearly yield of 6,000 vedros, predominated, but the actual number of distilleries formerly in action is not exactly known. As regards Poland, in 1860 there were as many as 1,897 distilleries with a yearly capacity of 7,800,000 vedros of underproof spirits.

From approximate data on the yield of the distilleries of the Russian Empire during the last years of the leasing system, it may be estimated that shortly before the introduction of the excise system the production of spirit was as follows:

	Vedros of under- proof spirits.
European Russia (not including the Baltic provinces) and Siberia	52,000,000
Baltic governments	3,000,000
Poland	7,800,000
Total	62,800,000

The above figures correspond to 23,864,000 vedros of anhydrous spirits, for the preparation of which about 8,350,000 chetverts of rye were required, counting that in the Russian governments and Siberia one chetvert yields seven and a half vedros, and in the Baltic governments and Poland, eight vedros of underproof spirits.

The introduction of the excise system in 1863 gave great freedom to the spirit industry in Russia, because its manufacture became a free enterprise, and the traffic in spirits an object of free trade. A tax was instituted in the form of an excise upon the production, and of license dues upon the distilleries and places of sale. The dues upon distilled spirit was first fixed at 4 kopecks per degree, equalling one-hundreth part of the vedro, and in its computation the normal yield of spirit from all the materials used in practice at the different works was determined. Thus, the yield of the various foodstuffs, including millet, buckwheat and peas, was fixed at 24 to 36 degrees, of potatoes from 8 to 8.5, and of beet at 6.5 to 7 degrees per poud. Moreover, the Government wishing to guarantee a more or less definite revenue, and to incite the distillers to perfect the technical side of the industry, gave them the right

to the free use of whatever amount of spirit they obtained over the normal, the so-called *superdistillate*, which considerably aided the perfection of the industry in the sense of giving better returns. On the other hand the distiller who, from want of care or knowledge, obtained a yield below the normal, a *subdistillate*, was obliged to pay excise for the entire normal yield. As the yield of spirit is also determined by the quality of the material, therefore two normals were fixed, a higher and a lower, the choice of which was left to the distiller, with this difference that if he chose the higher normal, he obtained the right over all the superdistillate, while if he chose the lower he had to pay excise upon half the subdistillate.

Under such favourable conditions it might have been expected that the number of distilleries would have increased, but as each one had to be under the supervision of the excise office, the new system, in order to facilitate the control, limited the extent of the production by fixing the lowest yearly production at 2,250 vedros of underproof spirits, and forbidding distilleries with a smaller yield. The distilleries were under the constant supervision of an excise officer who controlled the materials for the mashes, so as to guarantee as far as possible the amount of the excise due to the State. In order to prevent the mashing of the superfluous materials, the capacity of the fermentation vats was accurately measured, and it was presumed that each poud of mashed foodstuffs corresponded to nine vedros of capacity of the fermenting vat; each poud of potatoes, to three and a half vedros; and each poud of beet to two and a half vedros; while the minimum capacity of all fermenting vats was fixed at 540 vedros.

The result of these measures was the closing of the smaller distilleries, on the one hand, and the development of the larger and perfected distilleries, on the other. It was found that, during the first year of the introduction of these measures, only 4,386 distilleries out of the previously existing 4,624 satisfied the new requirements, and out of these only 4,019 were really in action. The reduction chiefly took place in the formerly privileged governments; in the Baltic governments the number of distilleries changed but little, while in the Great Russia governments a number of new distilleries were built, which however were soon closed, only leaving the larger and well-constructed ones in action.

Experience soon proved that the fixed normals of the yield of spirit were far from being the limiting amounts, and that it was possible with a certain knowledge to obtain large superdistillates from all the materials. It was found that the manufacture of spirit from potatoes, for which a very low normal had been taken, was particularly profitable in this respect, and hence the production of potato spirits more than doubled in the space of two years. In the Baltic governments, the amount of superdistillate obtained, reached 20.9 per cent, while the quantity of cereals distilled hardly varied. In some instances, as in Esthonia, the percentage of superdistillate attained the large figure of 33 per cent; in other places, on the contrary, an underdistillate was obtained. Hence the amount of the excise obtained from the actual production began to vary within very wide limits, and the difference in the cost of the manufacture in different works often amounted to 75 per cent. At the same time it was found that, owing to the cheapness of grain, labour and fuel, the manufacture of spirits was really very inexpensive. Thanks to these conditions the production of spirits began to increase rapidly, but owing to the want of good means of commu-

nication it could not be brought quickly to the places of consumption, but accumulated at the distilleries, and caused a considerable fall in the price.

It was found that, under the new system, the price of the spirit was not determined by the yield or actual cost of production, but by the amount of superdistillate obtained. Hence, all the efforts of the distiller were directed to increasing the production, in order to obtain a larger amount of superdistillate without taking into consideration the other elements of the industry. In many places the malt was not of the least consideration but was thrown away, into rivers or elsewhere. The spirit manufacture began to isolate itself from the agricultural interests, and to pass into an independent industry. The larger distilleries were set up with every technical improvement, which enabled them to obtain a considerable superdistillate; and the distillers, following up this narrow aim, more often gravitated towards the towns, which presented greater advantages than the villages. Under these circumstances the manufacture began to acquire a commercial character, and to concentrate itself in the hands of capitalists. This fact, combined with the improvements made every year in the modes of manufacture, the installation of perfected apparatus for distillation, and the improved processes for treating the spirit-yielding materials, induced the Government to undertake a whole series of measures with the object, on the one hand, of gradually diminishing the superdistillate and increasing the normals, and on the other hand, of diminishing the measure of capacity of the fermentation vats per poud of spirit-making stuffs, and also of changing the system of fermentation, that is, of diminishing the number of days employed by the distillers for the process of treating the mash from which the spirit is distilled. The first alteration made in the normals took place in 1864, when they were raised from 3 to 4 per cent for grain stuffs, and from 12 to 30 per cent for potatoes; then, in 1866 a third and higher normal was added to the former two. This normal was determined at 37° for dried cereals, at 24.66° for green malt, 11.66° for potatoes, and 7.5° for beet; but in 1876 these normals were again raised to the following figures:

	Lower.	Medium.	Higher.
For grain stuffs . .	33° to 35°	35° to 37°	37° to 38°
» green malt . .	22° » $23\frac{1}{2}^{\circ}$	$23\frac{1}{3}^{\circ}$ » $24\frac{2}{3}^{\circ}$	$24\frac{2}{3}^{\circ}$ » $26\frac{1}{3}^{\circ}$
» potatoes . . .	9° » 9°	$10\frac{1}{2}^{\circ}$ » 11°	$11\frac{2}{3}^{\circ}$ » 12°
» beet	$6\frac{1}{2}^{\circ}$ » $6\frac{1}{2}^{\circ}$	7° » 7°	$7\frac{1}{2}^{\circ}$ » $7\frac{1}{2}^{\circ}$

At the same time the capacity of the fermenting vats per poud of stuff was changed as follows:

	1864.	1866.	1871.	1876.
For dry grain stuffs.	9 vedros	9, 8, 7 and 6 vedros	7 and 6 vedros	6 vedros
» green malt . .	6 »	6, 5.66, 4.5 and 4 »	4.66 and 4 »	4 »
» potatoes . . .	2.5 »	2.5, 2.25, 2 and 1.75 vedros	2 and 1.75 »	1.75 »
» beet. . . .	2.5 »			

The duration of the fermentation process was fixed at three to five days. With respect to the unassessed superdistillate, its extent was made to depend not only upon the normals, but also upon the capacity of the fermenting vats chosen by the distiller. The amount of the permissible superdistillate was also gradually lowered;

in 1871 its maximum was fixed at 12 instead of 18 per cent as formerly; in 1876 it was lowered to 10, and in 1879 to 7 per cent from spirit distilled according to the higher normal.

Simultaneously with the adoption of the above measures the financial administration endeavoured, in the interest of the fisc and with the view of equalizing the conditions of the large and small distilleries, to arrive at a more accurate control over the spirit distilled. And indeed, under the diversity of the economical conditions in different parts of the Empire, and under the variety of the methods of manufacture, class of spirit-yielding stuffs, and construction of the distilleries themselves, the most equitable mode of taxation must be recognized as that which is assessed upon the actual yield of spirit. Therefore, when the regulations for the excise upon spirit were being formed, a proposal was made to compute this excise by means of controlling instruments for measuring the quantity actually produced; but it was found impossible to realize this proposal until the efficiency of such instruments had been carefully and fully tested. These researches were continued up to 1868, when it was decided as an experiment to introduce Stumpe's controlling apparatus into four of the distilleries of the northwestern governments. Owing to the favourable results obtained by this apparatus it became more generally used, but subsequently between 1873 and 1874 it was gradually replaced by Siemens's more perfect instrument, which not only determined the volume of alcoholic liquid passing through it, but also the amount of absolute alcohol it contained. At the present time all the Russian distilleries are furnished with Siemens's controlling and measuring apparatus, which is used for calculating the amount distilled.

Although, with the general introduction of these instruments for calculating the actual quantity of spirit distilled, the normals of the yield of spirit from the different stuffs lost their previous significance as the chief basis for calculating the amount of spirit subject to assessment, still these normals remained in force as the obligatory minimum yield of spirit from various stuffs, and as evidence of the regular working of the distilleries. Thus, at the present time the calculation of the excise is based upon the actual and normal yield of spirit, and upon the amount of anhydrous alcohol contained therein. These measures for a more rational estimation of the spirit actually distilled were accompanied by a rise in the excise upon spirit for the whole Empire. Thus, the excise was first raised in 1864 from four to five kopecks, then in 1869 to six kopecks, and in 1874 to seven kopecks per degree. When the excise system was introduced into Poland in 1866 the excise was fixed at 2.5 kopecks per degree, but it was afterwards raised in 1869 to 4 kopecks, in 1873 to 5.5 kopecks, and in 1876 it was made equal to that of the other parts of the Empire, namely 7 kopecks.

The above measures had the effect of decreasing the total number of distilleries, and of increasing the yield of the larger works. During 1866 to 1867 there were 3,384 distilleries working in the Empire, not including Poland and Siberia, and in 1871 to 1872 their number had decreased to 2,807, while the yield of spirit has risen from 26,525,568 vedros to 28,603,059 vedros; thus, the average yield of spirit per distillery had risen from 7,839 in 1866 to 1867 to 10,190 vedros in 1871 to 1872. The spirit industry continued to progress in the same direction, after the adoption of the excise system for twenty years, and in 1879 to 1880 there were altogether,

not including Poland and Siberia, 2,024 distilleries in operation with a total yield of 31,145,321 vedros, which form on the average an output of 15,388 vedros per distillery. With respect to the kind of spirit-yielding materials used during this period, the data bearing upon this subject indicate an almost general employment of potatoes and green malt, in preference to grain, owing to the somewhat complex conditions and requirements of the excise regulations. At the same time the manufacture of spirit from molasses made considerable progress in the beet sugar districts, while in the northern governments, Archangel and Olonets, the manufacture of spirit from lichens and moss was started. But, owing to the difficulty of collecting and transporting these materials to the distilleries, and also to the unsatisfactory results obtained, the manufacture of spirit from moss was completely given up. The distilleries made considerable progress in their technical respects, and there was no improved apparatus or process which was not applied in Russia. The direct result of this policy was the of obtaining better yields of spirit, which sometimes reached an average of 41° per poud of grain, or 17° per poud of potatoes. At the same time the old-fashioned distilleries, of which there were many on different private estates, were gradually closed, while the better installed works, even if small like those in the Baltic and north-western governments, continued to operate more or less actively.

During the third decade of the enforcement of the liquor excise system, the endeavours of the Ministry of Finance were chiefly directed in the same path as during the second decade, namely, to the regulation of the production by a limitation of the exemptions allowed upon it, and to the increasing of the Government revenue from the manufactures. With respect to the first, mention should be made of the law of June 9, 1887, establishing only two normals for grain and potato distillation, a lower and a higher, in the place of the former three normals, lower, medium and higher, namely:

	Lower normal.	Higher normal.
For different grain stuffs with the exception of green malt	36°	38°
For green malt	24°	25.30°
For potatoes	10°	12°

The normal for beets, the distillation of which is not practised in Russia, was abolished, and they were relegated to the number of stuffs whose normals are established by the Ministry of Finance in accordance with the results obtained by experience. One normal of 25° of anhydrous spirits per poud was established for beet molasses. As regards the non-assessed superdistillate, it was started from July 1, 1886, on the basis of the law of May 18, 1885, estimated according to the following calculation. For spirit distilled according to the higher normal, with a three days fermentation, 7 per cent of the first million degrees, only 5 per cent of the remainder were allowed as superdistillate. A corresponding diminution was made for the other normals, and for a four days fermentation. On July 1, 1888, the amount of non-assessed superdistillate was further diminished to 5 per cent for the first million degrees, and 3 per cent for the remainder of the distillate. The latter measure had partly the object of supporting the smaller distilleries, but it did not succeed in so

doing, because the restriction only touched upon one limit, the distillation of spirit to the extent of over one million degrees, without any further diminution in the corresponding extent of this reduction. With the direct object of increasing the Government revenue, the extent of the excise was gradually raised, first in 1881 to 8 kopecks, and then in 1885 to 9, and in 1888 to 9.25 kopecks.

Among the measures adopted by the Ministry of Finance for regulating the spirit industry, reference should be made to the encouragement of the exportation of spirit, with the object of enlarging the market for the Russian product. During the first half of the sixties the exportation of spirit from Russia was of a purely incidental character, and did not exceed 100,000 vedros of anhydrous spirit, the greater part of which was forwarded through Odessa to Turkey, while the remainder was sold in Germany and certain other countries. The Ministry of Finance, in order to aid the exporter, subsequently allowed certain exemptions independent of the excise system in vogue. These exemptions consisted in allowing a premium of 3 per cent upon the exportation of the refined spirit of a strength of not less than 90°, besides a certain percentage for covering the cost of transport. At first this measure was adopted as an experiment for a period of two years, but owing to its success it was continued and remained unaltered until 1883. At first, with the inconsiderable five-kopeck excise and a comparatively small superdistillate, these exemptions did not present any special attractions, but when the excise was raised in 1869, and as the superdistillate increased with the improved technical position of the distilleries, the foreign market proved very profitable. Between 1869 and 1873 the export of spirit rose to an average of 661,170 vedros per year. In 1884 the 3 per cent exportation premium was extended to spirit of all strengths, and a further premium of 3 per cent was allowed upon refined spirit of strength not below 95°, with a view to the loss incurred in its preparation.

The augmentation of the exportation premium in 1884, combined with the comparatively high excise upon spirit (8 kopecks per degree), had a powerful influence in increasing the exportation, which rose in the short space of four years to 21.8 per cent of the total production. This was due to the fact that the actual price of the spirit lost its primary importance, and the chief object of the exporter was to obtain the exportation premium. Under such a condition of affairs not only was there an excess of spirit exported, but it was manufactured specially for this object, which instead of relieving the home markets from over supply acted as a still greater encouragement to produce more. At the same time the payment of the exportation premium, in yearly increasing amounts, necessitated correspondingly increasing sacrifices on the part of the Treasury. This induced the Government to undertake corresponding measures to lessen the expenses of the State without injury to the spirit manufacture. Hence in 1887 it was found necessary to gradually decrease the exportation premium, and the good effects of this measure were not tardy in evincing themselves; the loss to the State from the exportation of spirit began to lessen every year, while the extent of the export was far from decreasing in the same degree.

Besides their chief consumption as a drink, liquors have also a somewhat wide application in many chemical and technical manufactures, partly as primary and partly as accessory materials. The Ministry of Finance, recognizing the importance of the preparation in Russia of certain chemicals only obtainable with the help of spirits,

and desiring also to place the Russian chemical works in a position to compete with the foreign laboratories enjoying spirit free of excise, found it possible to permit the sale of unassessed spirits for the preparation of ether, santonine, tannin, chloroform, chloral et cetera, with the observance of certain conditions for guaranteeing the interests of the State, and for preventing the use of non-assessed spirits for other purposes than the above. These conditions were the methylation of the spirits on the one hand, and a constant control by the excise officer, on the other.

The first exemptive measures respecting the allowance of unassessed spirits for chemical manufactures were adopted by the Ministry of Finance in 1880 as an experiment for a term of three years, and were taken advantage of by several chemical works for the preparation of ether*. In the case of spirits for the separation of ether the term was subsequently prolonged several times, in 1883, 1887, 1889 and 1892, each time for three years. The spirit destined for the preparation of other chemical products was first exempted from excise in 1884, also for a term of three years, but the term was afterwards prolonged in 1887 and 1890. Among other industries the treatment of beet molasses, for the extraction of its sugar by the elution process, was permitted the use of unassessed spirit in 1891, while on April 27, 1891, the preparation of smokeless powder, at one of the State powder works, was added to the number of these industries.

The most important measures recently passed by the Government respecting the manufacture of spirits, were the law of June 4, 1890, for the encouragement of rural distilleries, which came into force on July 1, 1891, and that of November 23, 1892, raising the excise upon spirit to 10 kopecks per degree. The publication of the first of these laws, giving certain essential advantages to the rural distilleries, originated in the oppressed position of the latter owing to the powerful pressure brought to bear upon them by the larger and chiefly industrial distilleries. As there was no doubt but that the enforced yield of these distilleries was, to a considerable extent, supported by the non-assessed superdistillate, of which the distillers obtained more, the larger the amount of spirit they distilled, and as the lessening of the superdistillate from 5 to 3 per cent of the whole amount of spirit beyond the first million degrees was shown by experience to be insufficient, it was decided to replace the superdistillate by an exemption from excise of a certain percentage of the whole amount of spirit, independent of the normal of the yield and the period of fermentation. This measure, which did not reward the distiller for forcing the yield of his distilleries, or for obtaining high returns of spirit, but compensated him for actual losses in the form of over drying and leakage of spirit, formed the most essential point of the law of June 4, 1890. Starting from the supposition that the larger and the better constructed the distilleries were, the less the losses were sustained by them, and that it was difficult for the smaller distilleries to have costly plant, and that hence they were always liable to greater losses, the new law distributed the allowance of non-assessed spirit in conformity with the actual losses at distilleries of different dimensions, and almost in the reverse proportion to the extent of the yield of spirit, namely as follows:

* Previous to this, according to the laws of July 4, 1861, and of October 31, 1866, unassessed spirits were allowed to be used only in the manufacture of spirit-turpentine lighting fluid.

For the first million degrees (34,570 gallons at 94 per cent Tralles)	2	per cent
For yields over one to three million degrees (103,710 gallons at 94 per cent Tralles)	1.5	» »
For yields over 3 to 12 million degrees (414,840 gallons at 94 per cent Tralles)	0.5	» »

No allowance was made for yields over 12 million degrees. Another very important clause in the law of June 4, 1890, having the immediate object of protecting the rural distilleries in general, and the smaller ones in particular, was the allowance of a further percentage free from excise in favour of the rural distilleries, but only to the amount found actually necessary to protect these distilleries from oppression on the part of the large concerns, and for supporting the smaller rural works. This additional allowance was determined as follows:

For the first half million degrees (17,285 gallons at 94 per cent Tralles)	4	per cent
For yields from one-half to 1 million degrees (34,570 gallons at 94 per cent, Tralles)	2	» »
For yields from one to three million degrees (103,710 gallons at 94 per cent, Tralles)	1.5	» »
For yields from three to six million degrees (207,420 gallons at 94 per cent, Tralles)	0.5	» »

No additional allowance was made for yields above six million degrees. A rural distillery was said to be one in which the manufacture of spirit was carried on for 200 work days between the 1st of September and the 1st of June, with a total yield of not over 75 vedros of spirit of 40° per each dessiatine of arable land on the estate. But in order to have the right of the additional excise exemption, the distillery must be on an estate, disposing of not less than 60 dessiatines of arable land, and the dimension of the distillery itself must be in direct proportion to the area of such land. In general the new law put a limit on the development of the large distilleries, as it, amongst other things, forbade the erection of new distilleries having a total capacity of fermentation vats of over 9,000 vedros, or the existing distilleries with that capacity of vats to increase their output above that figure, or those having a smaller capacity to increase it above 9,000 vedros. Moreover, this law forbade the erection of new distilleries in towns after July 1, 1890, and the formation of Stock Companies for the erection, or the acquisition of new distilleries by already existing Stock Companies in whose statutes the right of the erection of distilleries is not mentioned.

The same law of June 4, 1890, abolished the lower normal of the yields of spirit and the four days fermentation. Thus, after the first of July, 1891, the following normals of the yields of spirit from a poud of material remained in force:

1. From grain stuffs, and also from dry malt and maize 38°
2. From green malt 25.33°
3. From potatoes 12°
4. From beet sugar molasses. 25°

The duration of the fermentation was limited to three days in all distilleries.

As regards the law of November 23, 1892, by which the rate of the excise upon spirit began from December 1, 1892, it raised the rate from 9.25 kopecks per degree, or 9.25 roubles per vedro of anhydrous alcohol, that is, 1.37 dollars per American gallon of 94 per cent Trallis, to 10 kopecks per degree or 10 roubles per vedro of anhydrous alcohol, which corresponds to 1.48 dollars per gallon at 94 per cent Trallis. This measure, like the preceding augmentation of the excise, was called forth by the requirements of the Government Treasury, and the necessity of increasing the liquor revenues.

THE PRESENT POSITION OF THE SPIRIT INDUSTRY IN RUSSIA.

The clearest representation of the gradual development of the spirit industry to its present position, is given by an examination of the results of the enforcement of the liquor excise system since its adoption, namely from 1863 to 1892.

Among all the State imposts upon the manufacture and trade of spirituous liquors, the greatest increase during this period occurred on the introduction of the actual excise revenue, although other imposts had also risen to a considerable degree. During the last years of the existence of the leasing system, the total revenue brought to the Government by the spirit industry scarcely reached 100,000,000 roubles, but very soon after its abrogation the excise revenue alone exceeded this sum. The figures of the following table, giving the revenue from the excise upon spirit from 1863 to 1890, testify to the rapid growth of this impost, which increased nearly two and a half times during the twenty-nine years.

YEARS.	REVENUE. Millions of roubles.	YEARS.	REVENUE. Millions of roubles.	YEARS.	REVENUE. Millions of roubles.
1863 *	106	1874.	175	1883.	223
1864	114	1875.	173	1884.	217
1865	112	Rate of excise 7 kop. per degree.		1885.	207
1866	106	1876.	167	Rate of excise 9 kop. per degree	
1867	121	1877.	167	1886.	209
1868	121	1878.	189	1887.	229
1869	122	1879.	200	Rate of excise 9.25 k. per degree	
1870	149	1880.	197	1888.	237
1871	156	1881.	205	1891.	247
1872	155	Rate of excise 8 kop. per degree		1890.	239
1873	157	1882.	223	1891.	220

* In 1863 to 1866 no excise was levied in Poland, while in the rest of the Empire it was rated in 1863 at 4 kopecks per degree, or one-hundreth part of a vedro of anhydrous spirit; at 5 kopecks per degree in 1864 to 1869, and at 6 kopecks per degree in 1870 to 1873. In Poland it was rated at 2.5 kopecks per degree in 1867 to 1869, at 4 kopecks in 1870 to 1873, at 5.5 in 1874 and 1876, and afterwards at the same rate as the rest of the Empire. Finland does not enter into the calculations.

If to these be added the license, propination, and other dues, and also the revenues brought in by vodka, liquor, beer, mead and yeast, then the entire liquor revenue for the last fourteen years is expressed by the following figures.

Y E A R S.	R O U B L E S.	Y E A R S.	R O U B L E S.
1878	212,809,370	1885	231,188,767
1879	228,130,367	1886	236,917,945
1880	222,328,144	1887	257,576,217
1881	224,264,227	1888	265,045,981
1882	251,841,712	1889	274,865,424
1883	252,644,889	1890	268,307,208
1884	243,963,663	1891	247,440,851

At the time of the introduction of the excise system there were 6,487 distilleries. Since the enforcement of the excise system 2,106 new works were erected, but during the same period 4,728 or 73.4 per cent of the previously existing distilleries, and 1,053 or 50 per cent of the newly erected ones, were closed; so that now there only remain 2,742 distilleries, of which 1,053 are new, and 1,689 are old. The large amount of old distilleries which ceased working is explained by the fact that the previously existing distilleries, chiefly small, did not satisfy the new requirements, and could not withstand the competition of the large concerns. The accompanying table gives the number of distilleries and their yield, that is, the average total yield of all the distilleries, and the average yield per distillery for periods of five years.

P E R I O D.	AVERAGE NUMBER OF DISTILLERIES.	AVERAGE YEARLY YIELD OF ANHY- DROUS ALCOHOL, IN VEDROS.	AVERAGE YEARLY YIELD PER DISTIL- LERY OF ANHY- DROUS SPIRIT, IN VEDROS.
1866—1871	4,353	29,432,418	6,760
1871—1876	3,460	31,294,434	9,045
1876—1881	2,596	30,729,466	11,840
1881—1886	2,449	32,702,175	13,356
1886—1891	2,107	32,155,966	15,261

Thus, during the last twenty-five years, the number of distilleries has gradually diminished from an average of 4,353 to 2,107, while the average yield of spirit per distillery has at the same time considerably increased, from 6,760 vedros to 15,261, that is, 225 per cent; although the number of distilleries in action has fallen 59 per cent.

A closer acquaintance with the present position of the Russian liquor trade will be acquired by a review of the most important statistical, technical, and economical data with reference thereto, covering the years 1889—1890 and 1890—1891.

The distilleries themselves may be grouped into three categories according to their capacity, namely, small distilleries with a yield of not over 10,000 vedros of anhydrous spirit, 34,570 American gallons at 94 per cent Tralles; medium distilleries with a capacity of from 10,000 to 40,000 vedros of anhydrous spirit, 34,570 to 138,280 gallons at 94 per cent Tralles; and large distilleries with a yield of over 40,000 vedros, 138,280 gallons.

During the years 1889—1890, and 1890—1891, the distribution of the distilleries according to the above categories and districts was as follows:

DISTRICTS.	D I S T I L L E R I E S I N A C T I O N .					
	S m a l l .		M e d i u m .		L a r g e .	
	1889—90.	1890—91.	1889—90.	1890—91.	1889—90.	1890—91.
Northern	40	40	13	13	1	2
Eastern.	16	16	27	25	21	24
Central manufacturing . .	60	60	37	44	8	8
Central Chernoziom . . .	26	26	129	130	56	77
Little Russia	73	74	64	63	12	12
Baltic	125	189	195	123	5	3
North-western.	330	340	64	58	—	—
South-western	161	146	90	87	13	19
Southern	11	6	36	38	12	10
Poland	271	255	112	122	1	1
Siberia and Turkestan . .	8	10	29	26	9	9
Total	1,137	1,162	796	729 *	149	163
Per cent	55	56.5	38	35.5	7	8

As regards the number and yield of the distilleries, Russia may be divided into two great zones, the Western and Eastern. The Western includes the Baltic, north-western, south-western, Little Russia, and the Polish districts; while the Eastern zone embraces the central Chernoziom country, the central manufacturing, and the eastern districts. The distilleries may thus be grouped under the following eleven districts, embracing governments and provinces more or less similar in their industrial conditions:

1. The Northern district, including the governments of Archangel, Vologda,

* There was, in addition to the above, one distillery in the Transcaspian provinces, producing over 20,000 vedros (69,440 gallons) of spirit.

Novgorod, Olonets, Pskov, and Petersburg; 2. The Eastern district, consisting of the governments of Viatka, Kazan, Orenburg, Perm, Samara, and Ufa; 3. The Central manufacturing district, which includes the governments of Vladimir, Kaluga, Kostroma, Moscow, Nizhni-Novgorod, Smolensk, Tver, and Yaroslav; 4. The central Chernoziom country, with the governments of Voronezh, Kursk, Orel, Penza, Riazan, Saratov, Simbirsk, Tambov, and Tula; 5. Little Russia, with the governments of Poltava, Kharkov, and Chernigov; 6. The Baltic district, including the governments of Courland, Lithuania, and Esthonia; 7. The north-western district, including the governments of Vilna, Vitebsk, Grodno, Kovno, Minsk, and Moghilev; 8. The south-western district, including the governments of Volyn, Kiev, and Podolia; 9. The southern district, including the governments of Astrakhan, Bessarabia, Ekaterinoslav, Don province, Stavropol, Tersk, Kuban, Tauride, and Kherson; 10. The district of Poland, including the governments of Warsaw, Kalish, Kelets, Lomzha, Lublin, Petrokov, Plotsk, Radom, Sedlets, and Suvalki; 11. The district of Siberia and Turkestan includes the whole of Siberia and Turkestan.

The yield of the distilleries, that is, the amount of spirit distilled, in thousands of vedros, and gallons, and the percentages of the total yield given by the distilleries of the different districts during the same periods, is given in the following table:

DISTRICTS.	1890 — 1891.			1889 — 1890.		
	Thousand vedros of anhydrous spirit.	American gallons 94° Tralles.	Per cent.	Thousand vedros of anhydrous spirit.	American gallons 94° Tralles.	Per cent.
Central Chernoziom	8,868	30,656,676	28.4	8,264	28,568,648	26.3
South-western	3,707	12,815,099	11.2	3,471	11,999,247	10.7
Poland	3,293	11,383,901	10.6	3,192	11,034,744	10.2
Baltic	3,076	10,633,732	9.9	4,407	15,234,999	14.0
North-western.	2,638	9,119,566	8.5	2,746	9,492,922	8.8
Little Russia	2,478	8,566,446	7.9	2,260	7,812,820	7.2
Eastern	2,236	7,729,852	7.3	2,186	7,557,002	7.0
Central manufacturing	1,880	6,499,160	6.0	1,664	5,752,448	5.3
Southern	1,500	5,185,500	4.8	1,685	5,825,045	5.4
Siberia and Turkestan	1,147	3,965,179	3.8	1,158	4,003,206	3.7
Northern	499	1,725,043	1.6	417	1,441,569	1.4
Total.	31,322	108,280,154	100.0	31,450	108,722,650	100.0

As regards the three above-mentioned categories of distilleries, the small, medium, and large, the following figures give the total and relative yields of each category:

	1890 — 1891.		1889 — 1890.	
	VEDROS OF ANHY- DROUS SPIRIT.	PER CENT.	VEDROS OF ANHY- DROUS SPIRIT.	PER CENT.
Small distilleries.	6,478,987	20.6	6,436,484	20.5
Medium d°	12,985,972	41.4	14,509,045	46.1
Large d°	11,857,476	38.0	10,504,112	33.4
Total.	31,322,435	100.0	31,449,641	100.0

In Russia the yield of spirit depends chiefly upon the harvest, as the latter, on the one hand, determines the degree of prosperity of the chief consumers, that is, of the agricultural population; and on the other hand, the scarcity or abundance of the necessary materials for the production of spirit. During the eighties a substantial change took place in the manufacture of spirit, owing to the fact that before 1881—1882 the chief material employed was grain stuffs; and corn spirit formed over 70 per cent of the whole production. However, from that time potatoes began to predominate as a spirit-yielding material, owing to the fact that their harvest is less fluctuating than that of grain, and also because they give a greater yield of spirit per dessiatine than grain stuffs. The greatest fall in the consumption of corn, and rise in that of potatoes, occurred in 1889—1890, when the potatoes distilled amounted to 92,618,288 pouds, or 1,493,843 tons, while only 39,180,629 pouds, or 631,742 tons, of corn stuffs were treated in the manufacture of spirits. This very great reduction in the consumption of grain, and the increase in that of potatoes, was due to the bad rye harvest, and the abundant potato crop of 1889. In the succeeding year the cereal harvest improved, and therefore a somewhat larger amount, 40,425,276 pouds, or 651,810.3 tons, was consumed in the manufacture of spirits. At the same time the potato harvest was bad, and the consumption fell to 85,042,436 pouds, or 1,371,209.8 tons. Besides grain stuffs and potatoes, a certain amount of beet molasses, forming the refuse of the beet-sugar works, is annually treated in the manufacture of spirit. During 1889—1890, and 1890—1891, the total yield of spirits was produced from the following materials in the following proportions:

	1890 — 1891.			1889 — 1890.		
	Pouds.	Tons.	Per cent.	Pouds.	Tons.	Per cent.
Grain stuffs, counting 3 pouds of green malt as equivalent to 2 of rye.	40,211,412	648,362	30.5	39,031,718	629,340.8	28.5
Potatoes	85,039,076	1,371,155	64.5	92,618,288	1,493,361.6	67.9
Molasses	6,293,716	101,479	4.8	4,877,277	78,640.3	3.5
Other materials	* 218,456	3,523	0.2	149,923	2,417.3	0.1
Total.	136,762,660	2,124,519	100.0	136,677,296	2,203,760	100.0

* This includes starch, potato, spelt and acorn flour, peas, grape, Jerusalem artichokes, et cetera.

Rye flour and grain stand at the head of the corn stuffs. During 1890—1891, 25,046,675 pouds or 403,848.3 tons, and during 1889—1890, 24,127,620 pouds or 389,030 tons, of rye were distilled, chiefly in the central Chernoziom, eastern, Little Russia, central manufacturing, south-western, and Siberian governments. After rye come green and dry malt, of which, taking 3 pouds of the former as equivalent to 2 of the latter, 9,877,007 and 9,934,881 pouds, or 159,255 and 160,188 tons, were distilled during the above-mentioned periods. Then comes maize to the amount of 3,757,425 pouds, or 60,583 tons, during 1890—1891, and 3,573,345 or 57,616 tons during 1889—1890; while the remaining corn stuffs amounted to 1,530,305 pouds or 24,690 tons during 1890—1891, and 1,395,872 pouds or 22,507 tons during 1889—1890. The largest quantities of potatoes were consumed in the following governments, as shown in the table below:

	1890 — 1891.		1889 — 1890.	
	Pouds.	Tons.	Pouds.	Tons.
Central Chernoziom	23,852,590	384,595	23,527,439	379,352
Baltic.	14,475,054	233,393	23,189,343	373,901
Poland	18,367,311	296,151	19,082,609	307,684
North-western.	12,501,256	201,568	13,581,728	218,990

The distillation of spirits from molasses was most developed in the governments yielding the largest amount of beet sugar, as below:

	1890 — 1891.		1889 — 1890.	
	Pouds.	Tons.	Pouds.	Tons.
South-western governments . . .	3,572,223	57,598	2,761,625	44,526
Little Russia	1,470,319	23,707	1,268,927	20,460

The distilleries working during 1890—1891 and 1889—1890 may be summarized as follows:

	1890—1891.	1889—1890.
Exclusive distilleries	2,006	2,035
Distilleries producing also yeast	49	47
Total	2,055	2,082

The yeast-producing distilleries exclusively treated corn stuffs to the following amounts:

Y E A R S.	Y I E L D O F S P I R I T S.	
	P o u d s.	Vedros of anhy- drous alcohol.
1890—1891.	3,053,434	1,010,923
1889—1890.	2,814,799	925,479

The improvement of the technical side of distillation is of great importance, as due to it a greater proportion of spirit is obtained in a shorter time and of a better quality from the same materials than with distilleries of more primitive construction. In seeking for a means of increasing the yields of spirits, and shortening the time necessary for its manufacture, the distiller first turned his attention to the possibility of an uninterrupted distillation of the wort, and a better mixing of the mash. The introduction of uninterrupted distilling apparatus considerably lessened the consumption of fuel for this purpose, and at the same time hastened the process of production of spirits. The application of steam motors for mixing the mash had a similarly favourable result, and the introduction of Heintz's steam extractor apparatus for boiling down the potatoes and grain, in the place of the former wooden steam vats with crushers, in the distillation of potatoes, hastened the treatment of the mash by at least five times, and gave the possibility of preparing very large mashes, which placed the potato spirit industry in a particularly favourable position. These successive improvements in technical respects made considerable progress, but as yet the economizing of fuel has received very little attention.

Out of the 2,055 distilleries working during 1890—1891, 439 had no boiling-down apparatus, while among the remaining 1,613 distilleries, 582 used simple wooden steam extractors, and 1,034 metallic steam extractors of high pressure. Thus, only 21.36 per cent of the total number of distilleries were without extractors, 28.32 per cent used simple wooden extractors, and 50.32 per cent, metallic extractors of high pressure. The distilleries employing the latter class of extractors predominate in the central Chernoziom governments, 90.9 per cent; in the Baltic provinces, 85.08 per cent; and in the central manufacturing governments, 62.4 per cent. The distilleries using simple wooden extractors are chiefly concentrated in the north-western governments, 64 per cent of the total number of distilleries being in that district; and of those in Poland using wooden extractors, 50 per cent. Those without extractors for boiling down the potatoes et cetera predominate in Siberia and Turkestan, 93.5 per cent; and in the south-western districts, about 62 per cent.

As regards the application of various kinds of mash vats, and appliances for crushing and bruising the materials, the number of distilleries using such vats without the above-named appliances, that is, of distilleries of a low technical grade, did not exceed 241 in 1890—1891, or 11.7 per cent of the total number. In 1889—1890 there were 284 such distilleries, or 13.6 per cent of the actual number. The majority of these distilleries were situated in the north-western region, where they amounted to 127, or 52.2 per cent of the whole number, or 32 per cent of the total number in the district. At these distilleries the mash is treated by means of simple hand shovels. At all the remaining distilleries the mash vats are furnished with stirrers,

either of simple construction or else of more perfected make, and with or without appliances for the passage of refrigerating water. Out of a total of 1,814 distilleries furnished with mash vats with stirrers, 1,175 or 64.77 per cent, had vats with simple stirrers, and 639 or 35.23 per cent, with stirrers of perfected construction. Moreover, at 568 distilleries, or 31.31 per cent, these stirrers were furnished with appliances for the passage of refrigerating water, and 71 distilleries, or 3.92 per cent, had no such appliances.

With respect to the class of motive power (horse, water, or steam) employed for moving the stirrers, the majority of works use steam power. During 1890-91 there were 1,117, or 54.36 per cent of such distilleries, the majority of which, 290 or 25.9 per cent, were situated in the Baltic provinces; Poland comes next, with 210 distilleries, or 18.8 per cent; and then the central Chernoziom governments, with 197 or 17.6 per cent. Horse power was employed at 663 distilleries, or 32.26 per cent, the greater number of which were situated in Poland, 154 or 23.23 per cent; in the south-western governments, 150 or 22.62 per cent; and in the north-western governments, 147 or 22.02 per cent. Water power was only used at 25 distilleries, that is, at 1.21 per cent of the total number. At the remaining 250 distilleries, or 12.17 per cent, the crushing was done by hand.

Distilleries may be divided into three categories, according to the method employed for cooling the boiled mash. To the first category belong the distilleries where the mash cooled in the vats themselves, either by simple means of ice or snow, or else by means of special appliances for the passage of cold water. During 1890-91 there were 672 such distilleries, or 32.7 per cent of the total amount. The majority of these distilleries, that is, 253 or 12.8 per cent, were situated in the Baltic provinces; 238 of these had vats furnished with appliances for the passage of water, while at 15 the cooling was done by the throwing in of ice or snow. There was also a considerable number, 89, of such distilleries in Poland, and 74 in the north-western governments. To the second category belong those distilleries which employ cooling pans, cooling rods, or simple wooden vats placed outside the distillery buildings. These distilleries predominate, there being 1,317, or 64.08 per cent, of the whole number; furthermore, at 691 distilleries the vats or cooling rods were furnished with stirrers, while at the remaining 626 there were no stirrers. The distilleries of the second category predominated in the north-western region, there being 319 out of 398, or 80.1 per cent; in Poland 274 out of 378, or 72.5 per cent; in the south-western region, 215 out of 252, or 85 per cent; in the central Chernoziom districts, 173 out of 231, or 75 per cent; in Little Russia, 110 out of 149, or 73.9 per cent.

To the third category belong the distilleries with specially constructed, and in the majority of cases, tubular condensers; these distilleries are in the minority, and in 1890-91 did not exceed 66, or 3.21 per cent of the whole. The majority of these works were situated in Poland and the Baltic provinces, where there were 15 and 10 respectively.

The most generally adopted form of distilling apparatus is the common still, as is seen by the fact that in 1890-91, out of the total number of 2,055 distilleries, 1,190 or 58 per cent worked with different kinds of simple stills; while continuous-acting stills were only employed at 865 distilleries, or 42 per cent of the total number. The distilleries employing common stills were chiefly distributed as follows: in the north-western region, 357 or 17.3 per cent; in Poland, 253 or 12.3 per cent; and in

north-western region, 197, or 9.6 per cent; and in the Baltic provinces, 106 or 5.1 per cent. Taking the percentage relation of the total number of distilleries in each district, and of the number of those employing common stills in those districts, the following results would be obtained: in the north-western region, 89.7 per cent; in the south-western region, 78.1 per cent; in the northern region, 75.5 per cent; in Poland, 66.9 per cent; in Little Russia, 56.3 per cent. As regards the continuous-acting stills, out of a total of 865 distilleries using this system, 714 employed single column stills and 107, double column stills; 42 distilleries possessed the Illhis, and two, one in the government of Tula and the other in eastern Siberia, worked with Coffey's stills. The distilleries having continuous-acting stills are distributed as follows according to the different districts: in the Baltic provinces, 209 distilleries or 24.2 per cent; in the central Chernoziom district, 195 distilleries or 22.5 per cent; in Poland, 125 distilleries, or 14.5 per cent.

The percentage relation of the number of distilleries employing continuous-acting stills to the total number of distilleries in each district is as follows: in the central Chernoziom district, 84.4 per cent; in the eastern district, 76.9 per cent; in the Baltic provinces, 66.3 per cent; in the southern district, 55.6 per cent; in Siberia and Turkestan, 54.3 per cent.

The fuel employed by the distilleries is of various kinds, wood, coal, peat, straw, and naphtha refuse; but wood still predominates, and in 1890-91, formed the sole fuel used in 1,565 distilleries, that is, 76.1 per cent of the total. Then follow the distilleries using mixed fuel, wood and coal, or coal and peat, or wood and straw, of which there were 300 or 14.9 per cent; and sixty-nine, or 3.4 per cent, burned coal alone; these were principally situated as follows: in Poland 26, and in the southern district, 14 distilleries. Peat alone was used in 73 distilleries, or 3.55 per cent, of the entire number, and chiefly in Poland in 47 distilleries, and in the central Chernoziom governments in 17 distilleries. Straw alone was used in 31 distilleries, or 1.5 per cent, and mainly in the south-western district, in 15 distilleries. Lastly, naphtha refuse was employed in 17 distilleries, or 0.82 per cent of the total, and chiefly in the central Chernoziom district, in 11 distilleries.

A comparison of the distilleries of different dimensions, and in different part of the Empire, shows that the cost of the fuel consumed at the small distilleries varies between 1.59 and 17.44 kopecks per vedro of distilled spirits at 40°, that is, between 6.46 and 43.6 kopecks per vedro at 100°, or 0.58 and 6.5 cents per gallon at 94 per cent Tralles. At the middle-sized distilleries, the consumption of fuel varies between 1.74 and 20.7 kopecks per vedro of spirit at 40°, that is, between 4.35 and 50.17 kopecks per vedro at 100° or 0.64 to 7.5 cents per gallon at 94 per cent Tralles. At the large and generally better-constructed distilleries this difference is not so great, and the average consumption of fuel is less than at the small and medium-sized works.

In direct connection with the question of the technical position of the distilleries stands that of the technical capacity and education of the persons employed in the industry. However, the majority of those who work in Russian distilleries have not received any special technical education, but only have a practical experience at the local distilleries. Out of the 2,055 distilleries, in work during 1890-91, only 74 or 3.6 per cent were managed by distillers who had a scientific education; the

remaining 1,981 distilleries, or 96.4 per cent, were managed by practical men of no previous technical training. The total number of operatives employed at the distilleries during 1890-91 was 1,915, out of which 1,779 were men, 28 women, and 108 minors. The average number of operatives employed per distillery varied in the different districts, between 6 in Poland and the Baltic provinces, to 41 in Siberia and Turkestan.

The cost of manufacture is mainly determined by the cost of the spirit-yielding stuffs, and of fuel. Besides this, it depends to a considerable extent upon the following factors: the fixed and circulating capital, the number of labourers and other servants, the consumption of fuel, the repairs of the works, the preparation of the materials, the Government taxes, insurance, office and other expenses. Data collected at a large number of distilleries in various parts of the Empire show that the average cost of production per degree of anhydrous spirits is, not counting the spirit-yielding stuffs, 0.75 kopeck, or 75 kopecks per 100°, or 11.1 cents per gallon at 94 per cent. If the spirit-yielding stuffs be included, the cost of production comes to 1.75 kopecks per degree, or 1.75 roubles per 100°, or 26 cents per gallon at 94 per cent Tralles.

THE RECTIFICATION OF SPIRITS.

The chief destination of spirit is as a beverage in one or another form, and in Russia all its other uses are comparatively very inconsiderable. But the spirit obtained from the immediate distillation of the wort contains, according to the kind of stuff used and the mode of distillation, a greater or less amount of foreign substances, which lower its quality. Hence, in order to separate these impurities from the raw spirits, it is necessary to subject it to a repeated and fractional distillation, and to separate the products of the new distillations, setting apart those which are the purest, and subjecting the remainder to redistillation. This is done in special distilling apparatus, with dephlegmation columns, chiefly of the Sa Valle system, at special spirit refining, or at corn spirit works.

The entire separation of the raw spirit from the presence of fusel oil can only be accomplished by repeated distillation, and then the distillates obtained at different stages of the operation are of different degrees of purity and strength. The purest spirit, or the first quality prime, is obtained at the middle of the distillation, and the second and third qualities before and after the first quality, with a greater or less amount of fusel oil. These two qualities are subjected separately, or together with raw spirit, to a fresh distillation, in which the prime spirit is again set apart, and the poorest quality, or mixture of the fusel oil from the different distillates, is concentrated and collected separately. The results of the distillation depend chiefly upon the quality of the raw spirit, but in general are as follows:

Quality.	Strength.	Amount in percentage.
1. 3rd quality. . .	90.5	6
2. 1st » . . .	95.6	71
3. 3rd » . . .	72.2	4
4. 2nd » . . .	95.5	2
5 » » . . .	92.2	6
6. Fusel-oil. . . .	29.1	0.2

Owing to the great importance to the public health of the sale of the purest possible spirit, a law was published June 2, 1888, for the purpose of encouraging and protecting the rectification industry. The substance of this law, which made a radical change in the Russian spirit industry, consists in respect to hot and cold purification of spirit in the following features: The purification of raw spirit by the hot process, that is, by rectification, may be conducted at the distilleries producing it, without the levying of any special license; the installation of boilers for driving off the spirit held in the charcoal in the cold process, that is, by filtration through charcoal, may be sanctioned by the Ministry of Finance, also without any special license; the refuse remaining from the purification, both by the hot and cold process, may be presented to the excise officer for destruction, with the payment of an excise of one kopeck per degree upon the whole amount of spirit lost in the distillation, under the condition, however, that this amount shall not exceed 2.25 per cent of all the products of rectification, or 1.5 per cent of the whole amount of spirit passed through the controlling gear. Thanks to these practical measures, the spirit refining industry has lately begun to develop somewhat rapidly, and in 1890-91 was in the following position. With the exception of the Amour and littoral provinces, the purification of spirit in the Empire was carried on at 4,301 localities, of which 4,061 worked by the cold and 240 by the hot process. The first category included 880 distillery basements, and 3,181 wholesale stores. Of the localities where the hot process was used, 35 were special refining works, 77 were spirit-refining departments of distilleries, 70 were similar departments of corn spirit works, and 58 were distilleries not having rectifying apparatus in a special section of their buildings. The localities carrying on the purification of spirit by one or the other process, were distributed as follows:

D I S T R I C T S.	LOCALITIES CARRYING ON THE PURIFICATION OF SPIRIT.			
	By the hot process.		By the cold process.	
	1890—91	1889—90	1890—91	1889—90
Southern	11	13	802	1,046
Central Chernoziom	32	39	771	802
North-western	6	5	552	479
Little Russia	12	15	387	412
Central manufacturing	7	6	337	347
Eastern	26	28	223	207
Nothern	3	3	140	108
South-western.	19	19	21	94
Western Siberia	2	2	133	214
Baltic	50	52	74	75
Caucasus	2	2	81	89
Poland	54	57	27	22
St. Petersburg	13	12	61	62
Total.	237	253	3,709	3,956

Besides the above mentioned localities, in 1890 to 1891 the purification of spirit was carried on by the hot process at three works in Turkestan, and by the cold process at four basements of distilleries, and at 28 wholesale stores in Turkestan, and 15 distillery basements and 305 wholesale stores in eastern Siberia. The total amount of raw spirits subjected to rectification during 1890—91 was 483,330,461° while 147,247,586° of 2nd, 3rd, 4th and 5th quality spirit and ethers were subjected to secondary distillation, or in all 630,578,047°. The controlling apparatus indicated 658,910,731°. The total amount of products of rectification destined for sale was 504,663,783°, the greater part of which, 412,103,247° or 81.66 per cent, was 1st quality spirit; 2nd to 5th quality spirits were obtained to the amount of 92,509,037° or 18.33 per cent, while ethers were produced exclusively in Poland, to the amount of 51,499° or 0.01 per cent. During 1889—90 the results of the rectification of spirit were as follows: raw spirit subjected to secondary distillation 369,480,247°; 2nd, 3rd, 4th, and 5th quality spirits and ethers subjected to secondary distillation 118,355,485°, total 486,835,732°; controlling apparatus indicated 493,690,607°. Altogether 391,977,145° of rectified spirits were prepared for sale, out of which 321,194,503°, or 81.94 per cent, were first quality spirit, and 70,743,762°, or 18.05 per cent, 2nd to 5th quality spirit; while 38,880°, or 0.01 per cent, of ethers were exclusively produced in Poland.

A comparison of the above data for the rectification of spirit during 1890 to 1891, and 1889, to 1890 shows that in the first period the total quantity of spirit subjected to rectification exceeded that rectified during 1889 to 1890 by 29.3 per cent; that the amount of raw spirit refined was greater by 30.8 per cent; of 2nd and 5th quality spirits and ethers, by 24.4 per cent, and that the amount of spirit indicated by the controlling apparatus increased by 32.5 per cent. The total amount of rectification products put upon sale was greater by 28.3 per cent, 2nd to 5th quality spirit by 30.8 per cent, and ethers by 32.5 per cent.

As regards the actual loss of spirit in the process of rectification in 1890 to 1891, it amounted to 7,866,254° or 1.69 per cent, and in 1889 to 1890 to 6,276,845° or 1.69 per cent of the raw spirit subjected to rectification; while in 1888 to 1889 this loss even amounted to 1.89 per cent. Thus, the percentage of spirit lost during rectification has gradually increased; namely, the following amounts of raw spirit were deducted to cover this loss:

1888—89		2,783,936°	or 1.25	per cent of raw spirit
1889—90		4,584,962°	» 1.24	» » » » »
1890—91		6,978,201°	» 1.26	» » » » »

The refuse obtained during the same periods was as follows:

1888—89		2,769,806°	or 1.229	per cent of raw spirit
1889—90		4,015,100°	» 1.087	» » » » »
1890—91		5,318,537°	» 1.100	» » » » »

THE MANUFACTURE OF DRINKING SPIRITS OR VODKAS.

The manufacture of vodkas is intimately connected with the rectification industry, and is only permitted at special vodka works. Previous to the publication of

the vodka law of 1879, distillery basements and wholesale stores were only permitted to dilute the spirit, and to purify it by the cold process by filtration through charcoal; and moreover the strength of the spirit was required to be not under 40° Tralles. At vodka works, however, the strength of the article was not subject to control, and the addition of decoctions and of fruit essences to the spirit was allowed. Under this condition of affairs a low-proof liquor came into circulation under the name of «special vodkas», instead of the true vodka spirit; and moreover, this low-proof spirit was sold in such large quantities that it could but produce a decrease in the Government revenues, although in 1878 the number of vodka works reached 1,518. A new law respecting this matter, and brought into force on the 1st January, 1879, only permitted the sale of vodka liquors in glass vessels and with corresponding banderoles, on the estimation of a supplementary excise of 1 rouble per vedro of spirit at 40°, the supervision of the placing of the banderoles upon the vessels being laid upon the excise office. From that time the vodka manufacture began by degrees to separate itself from the refining of simple spirit, which as before was permitted at distillery basements and stores. At the same time the number of vodka works began to decrease rapidly. Already in the first year of the enactment of the new law 421 works closed, and in 1880 there only remained 596. This continued to be the case subsequently, so that in recent years there only remained the following number of vodka works in the Empire:

1886—87	322	1889—90	264
1887—88	300	1890—91	250
1888—89	267		

As regards the production of these works, at first it decreased with the number of works, and this continued to be the case until the first of January, 1886, when the law of December 9, 1885, came into force. This law treated of the preparation and sale of vodkas and had the object of ameliorating the position of the industry. In 1879 the above mentioned works yielded 1,747,002 vedros of various vodka liquors, while during 1885—86, only 1,165,842 vedros were produced. After the enactment of the above-mentioned law, the production of vodkas began slowly to increase, as also the average yield of the works.

Y E A R.	Number of works.	Yield of vodka.	Average yields.
1886—87	322	1,162,108	3,609
1887—88	300	1,177,651	3,926
1888—89	267	1,275,684	4,778
1889—90	264	1,367,183	5,179
1890—91	250	1,319,122	5,277

The greatest number of vodka works were concentrated, in 1890—91, in the Baltic governments and Poland, namely, 86 or over one-third of the total num-

ber of works; and also in the eastern and central Chernoziom governments, namely 63 works, and in the Petersburg and Moscow governments, namely 28 works. The least number of distilleries were in the south-western governments, in the Turkestan and Transcaucasian regions, and in the Little Russia governments. As regards the yield of vodka liquors, the first place belongs to the governments of Petersburg and Moscow, where in 1890—91, 28 vodka works produced 672,888 vedros of vodkas; then comes Poland with 156,234 vedros from 42 works, the Baltic governments with 108,888 vedros from 44 works, the eastern governments with 102,336 vedros from 33 works, et cetera. The smallest production was given by the region of Turkestan with 2,232 vedros for 2 factories, the Little Russia governments with 5,984 vedros for 5 works, and the south-western governments with 7,410 vedros for 2 works.

THE CONSUMPTION OF SPIRITS.

During the first years of the introduction of the excise system the total consumption of spirit in the Empire, not including Poland, was twenty-five million vedros of anhydrous alcohol. This figure was subsequently subject to a small fluctuation, and at the end of the seventies the total consumption of the country was twenty-nine million vedros. Subsequently, notwithstanding the territorial enlargement of the Empire, the annexation of new provinces, and the natural growth of the population, the consumption of spirit began gradually to decrease; and this is seen particularly clearly from the data giving the consumption per head. At the beginning of the sixties, the consumption per head for the Empire, not including Poland, was 0.37 vedro of anhydrous spirit, and at the end of the seventies this figure had fallen to 0.34 vedro. In recent years the amount of the total consumption, and consumption per head, has still further decreased, as is seen from the following data for the last nine years.

Y E A R.	Consumption per head; vedros of anhydrous spirit.	Y E A R.	Consumption per head; vedros of anhydrous spirit.	Y E A R.	Consumption per head; vedros of anhydrous spirit.
1883	0.33	1886	0.27	1889	0.25
1884	0.30	1887	0.26	1890	0.23
1885	0.28	1888	0.26	1891	0.19

The reason of this constant decrease in the consumption per head is undoubtedly to be found in the rise in the price of the spirit under the influence of the high excise; although very likely other circumstances had their effect, however not to such an extent. The consumption per head in the different districts varied considerably, as can be seen from the following data for 1891.

R E G I O N S.	CONSUMPTION OF SPIRITS, IN VEDROS.	
	Total.	Per head.
Metropolitan	2,647,961	0.64
Northern	731,460	0.16
Eastern	1,698,327	0.12
Central industrial	2,330,131	0.23
Central Chernoziom	3,547,726	0.18
Little Russia	1,570,899	0.20
Baltic	513,642	0.21
North-western	1,643,107	0.18
South-western	2,341,403	0.28
Southern	3,480,579	0.28
Poland	1,537,972	0.17

THE EXPORTATION OF SPIRITS.

Spirit forms one of the most important items of foreign export from Russia. Thus, in 1886 and 1887, the amount of liquors exported exceeded six million vedros, 19.5 million gallons, of anhydrous alcohol; and only a slight fall in this export has been observable in very recent years. According to the data for the ten years ending 1890, the export of spirit is expressed by the following figures.

Y E A R.	EXPORTED ANHYDROUS SPIRITS.		Y E A R.	EXPORTED ANHYDROUS SPIRITS.	
	Vedros.	Gallons.		Vedros.	Gallons.
1881	822,784	2,674,048	1886.	6,150,823	19,990,175
1882	2,400,308	7,801,001	1887.	6,496,981	21,115,186
1883	3,066,978	9,967,678	1888.	5,335,443	17,340,190
1884	2,324,830	7,555,697	1889.	3,982,498	12,943,119
1885	3,778,768	12,280,996	1890.	4,219,764	13,714,233
Total for 5 years.	12,393,668	40,279,420	Total for 5 years.	26,185,509	85,102,903
Averages . . .	2,478,734	8,055,884	Averages . . .	5,237,102	17,020,581

In 1891 the export of spirits from Russia amounted to 3,980,289 vedros, 12,935,939 gallons; hence there was a fall of 239,475 vedros, 778,294 gallons, or 5.7 per cent as compared with 1890. The relation between the total production and the export in 1890 was 13.9 per cent while in 1891 it was 12.6 per cent. The export of spirits from the different districts in 1891 and 1890 was as follows.

GOVERNMENTS.	ANHYDROUS SPIRITS EXPORTED.					
	In 1891.			In 1890.		
	Vedros.	Gallons.	Per cent.	Vedros.	Gallons.	Per cent.
Poland	1,178,378	3,829,728.5	29.6	1,250,546	4,064,274.5	29.6
South-western . . .	766,095	2,489,808.7	19.2	597,316	1,941,277.0	14.15
Baltic	569,731	1,851,625.8	14.3	1,573,883	5,115,119.8	37.30
North-western . . .	515,005	1,673,766.2	13.0	331,893	1,078,652.2	7.90
Central Chernoziom.	488,686	1,588,229.5	12.3	137,071	445,480.8	3.25
Little Russia . . .	431,484	1,402,323.0	10.8	307,563	999,579.7	7.30
Eastern	19,827	64,437.7	0.5	—	—	—
Southern	11,083	36,019.8	0.3	21,492	69,849.0	0.50
Total . . .	3,980,289	12,935,939.2	100	4,219,764	13,714,233.0	100

Thus in 1891, 29 per cent of the whole export fell to the Polish region, about 19.2 per cent to the south-western, 14.3 per cent to the Baltic, and 13 per cent to the north-western; altogether the western zone of the Empire furnished 75 per cent of the entire export, while in 1890 this region sent abroad about 90 per cent of the spirit exported, owing chiefly to the considerable shipments from the Baltic governments, which in that year supplied 37.3 per cent of the total export instead of 14.3 per cent as in 1891.

The greatest demand for Russian spirit comes from Germany which in 1891 received 67.9 per cent of the total export; after Germany comes Turkey, to which 12.2 per cent is forwarded, Sweden 7.3 per cent, Great Britain 5.5 per cent, Bulgaria 2.5 per cent, France 2.4 per cent, as is seen from the following data respecting the movement of spirit from Russia in 1891 and 1890.

C O U N T R I E S.	E X P O R T O F S P I R I T S.			
	In 1891.		In 1890.	
	Vedros.	Gallons.	Vedros.	Gallons.
Germany	2,703,761	8,787,223.2	2,511,432	8,162,154.0
Turkey	485,368	1,577,449.0	562,951	1,829,590.8
Sweden	291,237	946,520.2	615,569	2,000,599.2
Great Britain	217,181	705,838.3	276,135	897,438.8
Bulgaria	99,320	322,790.0	130,280	423,410.0
France	97,867	318,067.8	10,633	34,557.2
Egypt	65,603	213,209.7	61,132	198,679.0
Denmark	10,686	34,729.5	25,776	83,772.0
Greece	8,466	27,514.5	—	—
Belgium	555	1,801.8	—	—
Holland	—	—	12,936	42,042.0

As regards the export to Germany it should be remarked that the spirit sent there is chiefly forwarded to Hamburg, whence it goes to other countries, chiefly to Spain.

The exportation of specially refined spirits since 1885 was as follows :

	ANHYDROUS SPIRITS.		PER CENT OF RE-FINED SPIRITS TO THE TOTAL EXPORT.
	Vedros.	G a l l o n s.	
1885.	669,637	2,176,320.2	17.7
1886.	863,291	2,805,695.8	14.0
1887.	885,932	2,879,279.0	13.6
1888.	994,010	3,230,532.5	18.6
1889.	871,209	2,831,429.2	21.8
1890.	1,024,183	3,328,594.8	24.3
Average for 6 years.	884,710	2,875,307.5	17.7
1891.	887,160	2,883,270.0	22.3

Thus, compared to 1890, the export of refined spirits in 1891 fell by 137,023 vedros, 445,324.8 gallons, or by 13.4 per cent; still it was somewhat above the average for the six years period given above; its relation to the total amount of spirit exported was the most favourable of all the preceding years, with the exception of 1890.

Besides raw and refined spirit a certain quantity of vodka liquors are annually shipped abroad. In 1890 and 1891, the export of these liquors was expressed by the following figures, in degrees and gallons of anhydrous spirit:

	Degrees.	Gallons.
1890 . . .	258,236	8,392.2
1891 . . .	325,310	10,572.6

The greater portion, namely 95.8 per cent in 1890, and 90 per cent in 1891, of these liquors were exported through the Riga customhouse.

THE MANUFACTURE OF SPIRITS FROM GRAPES AND FRUITS.

Besides the manufacture of spirit from starchy materials, such as corn stuffs and potatoes, and from non-starchy materials, such as beet sugar molasses, there is an entirely separate branch of the spirit industry in Russia, which treats such materials as grapes, raw fruits, and berries, and the refuse from the preparation of wines. This industry, which is carried on partly as an independent, and partly as a branch manufacture in the preparation of wines, is most developed in the Caucasus, in the Transcaucasian region in the province of Tersk, and in the government of Stavropol, and also in Bessarabia, the Crimea, and in Turkestan.

In 1890—1891 the total number of fruit and grape spirit distilleries in the above and certain other localities, such as the governments of Kherson and Ekate-

Ekaterinoslav and province of the Don Cossacks was 2,641, but of these only 70, or 2.6 per cent, were large industrial concerns, partly steam with more or less perfected plant. The remaining 2,571, or 97.4 per cent, were small rural and almost exclusively oven distilleries, consisting of a small copper still with a movable cover and luted in a stove, and of a worm condenser immersed in a vat containing water or else a condensor in the form of a long straight tube placed in a gutter, also containing water. Very often in the Transcaucasian region such a distillery is erected under the open sky without even an awning over it, and in case of need can be easily transported from place to place.

The materials used for the preparation of spirit at the fruit distilleries are mainly the grape, that is, the juice and husk, the juice alone or together with the lees, and other refuse, or else wine itself, and in some parts of Transcaucasia mulberries are used in rather large quantities. As regards other fruits and berries their employment in the manufacture of spirit is far more limited than the above-mentioned materials.

During 1890-91 the above-mentioned 2,641 distilleries yielded 38,572,242° of spirit, or 1,333,442 gallons at 94° Tralles. A considerable portion of this, namely, 16,785,466°, or 580,274 gallons, or 43.1 per cent of the entire production, was manufactured in the Transcaucasian region; and a slightly less amount, 15,036,812° or 519,823 gallons at 94° Tralles, or 38.9 per cent of the entire production, was produced in the province of Tersk and government of Stavropol.

At the remaining localities, namely in the governments of Bessarabia, Taurid, Kherson, and Ekaterinoslav and in the province of the Don Cossacks, 6,749,964° or 233,346 gallons of spirit at 94° Tralles were distilled. Out of the 16,785,466° of spirit distilled in the Transcaucasian region, 12,238,694°, or 423,092 gallons at 94° Tralles, were prepared from grapes, and 4,546,772°, or 157,179 gallons at 94° Tralles, from other fruits, almost exclusively mulberries. The Transcaucasian region also stands first in respect to the number of distilleries, there being 2,398 or 90.80 per cent of the total number; then comes the Taurid government with 139 distilleries or 5.3 per cent, the northern Caucasus with 82 distilleries or 3.1 per cent, the government of Bessarabia with 11 distilleries or 0.4 per cent, and Turkestan with 8 distilleries or 0.3 per cent, while the remaining localities possessed one each.

Up to December 1, 1892, the spirit distilled from grapes, grape wine, and raw fruits and berries, was subject throughout the Empire to an excise of 6 kopecks per degree, or 6 roubles per vedro, that is, 89.3 cents per gallon at 94° Tralles. But on the expiration of that term the law of the 23rd November, 1892, came into force; this law raised the excise throughout the Empire, with the exception of the Caucasus, to 7 kopecks per degree, or 7 roubles per vedro, that is, 1.042 dollars per gallon at 94° Tralles. In the Caucasus this excise law came into force on June 1, 1893. With respect to the estimation of the yield of spirits by the excise, this is done in the more perfected distilleries having rectification and dephlegmation appliances, by means of controlling alcoholmeters, chiefly of the Steemp system; but at those distilleries which possess only oven stills the spirit is estimated by means of normal yields from the various materials in different localities, calculated per vedro of capacity of the still per day. Besides this, in certain localities, namely in the Crimea, the province of the Don Cossacks, and in the Artvinsk and Ba-

toum districts of the government of Kutais, the dues upon the fruit and grape spirits distilled at the small rural distilleries are levied, not in the form of an excise but, as a special license tax, to the amount of 1 rouble 50 kopecks to 2 roubles per vedro capacity of the stills for the whole period of production.

In recent times the manufacture of grape spirit has attracted serious attention, as a material for the preparation of cognac. This industry is mainly concentrated in the wine-producing districts, namely at Kizliar in the province of Tersk, in the Transcaucasian region, in Bessarabia and in the Crimea, and even outside these districts, as at Warsaw for instance. In these localities special works have been erected for the purpose, but as yet the production is very inconsiderable and may be said to be in its infancy.

The introduction of this industry into Russia dates from the middle of the present century, and the locality of its birth may be said to be the Kisliarsk wine-growing district, where a grape spirit was first prepared under the name of «kizliarka», which enjoyed a great renown, and was transported over the Empire in rather large quantities. From data collected at that time it is seen that in 1863 the export of kizliarka amounted to 10,000 vedros, and that it was locally employed for strengthening the wine. With the introduction of the present system of excise, the price of corn spirit fell, and the result of competition was the discovery of methods for purifying it from fusel oil. Owing to this the demand for kizliarka diminished year by year, and at the end of the sixties it had entirely stopped. It was not until the second half of the eighties that certain of the Kizliarsk wine growers again began to distill kizliarka for the purpose of transforming it into cognac, and they have continued to do so until now.

In the majority of cases the spirit is prepared from the settled and clarified juice, and the distillation is almost exclusively conducted in primitive furnace stills, which at first give a weak liquor of not above 30°, which is converted into a strong spirit of sometimes 72° by a second distillation.

The following table gives the total production of grape spirit at the furnace distilleries in the Kizliarsk district between 1884 and 1891.

Y E A R S.	DEGREES OF ANHYDROUS SPIRIT.	Y E A R S.	DEGREES OF ANHYDROUS SPIRIT.
1884—1885	26,000°	1888—1889	1,559,334°
1885—1886	221,784	1889—1890	819,857
1886—1887	1,088,000	1890—1891	6,776,547
1887—1888	1,628,256		

The cognac and cognac spirit exported from Kizliar goes chiefly to the Nizhni-Novgorod market to which the following amounts were sent between 1888 and 1891:

1888	292,502°
1889	73,374
1890	38,954
1891	182,793

The strength of this spirit is not under 55° Tralles in order that it might be bought by the vodka merchants for bottling and sale without labels, and without the payment of a supplementary excise.

Besides to the Nizhni-Novgorod Fair, the grape spirit is sent from Kizliar in the form of cognac to other localities such as Moscow, St. Petersburg, Warsaw and Tiflis. In Transcaucasia the production of high quality vodka from grape wine, or the pure grape juice, has only lately emerged from its experimental stage. At the present moment there are cognac works at Erivan, Tiflis, each of which possesses one distillery, and in the village of Agdam in the Shoushin district of the government of Elizavetpol, where there are two works. At all these factories the stills are furnace stills with dephlegmators, and the material used chiefly consists of the local, and partly imported grape wine from other parts of the Caucasus, while sometimes the fermented juice separated from the husks is also employed.

The following data will give an idea of the dimensions of the industry: in 1890 the Erivan distillery yielded about 127,000° of cognac, and the Tiflis distillery about 100,000° in the same year; besides this, the cellars of the Tiflis distillery contain a rather considerable store of grape spirit transported from other localities, which is kept until it becomes converted into cognac. The two distilleries at Agdam yielded during the autumn and winter of 1891 altogether 70,563° of cognac, of strength from 53 to 77 per cent.

In Bessarabia the cognac industry has only been started at two distilleries, one of which belongs to Mr. Tamoult, a landowner, and the other to Mr. Reidell, a merchant from Kishinev. At both these works the distillation of the spirit is carried on in perfected steam stills, one of which at Reidell's distillery is after the Egro system, and the best grape spirit, sometimes redistilled, is chosen for the preparation of the cognac. However, the production is not particularly great, especially at Tamoult's distillery which, out of a total of 1,773,168° of grape spirit distilled between 1888 and 1891, only converted 15,520° into cognac; while at Reidell's distillery only 157,500° were converted into cognac out of 258,910° distilled in 1890 and 1891. Such an inconsiderable yield and sale clearly show that the industry is still in its experimental stage, as the wine merchants have not yet become acquainted with the article.

In the Crimea the first trials in the preparation of cognac date from the seventies, but the production was so small at that time, that the product was very little known, and did not fetch more than 1 rouble 20 kopecks per bottle. The trials made on the estates of Prince Vorontsov, and now the property of the Imperial Appanage, deserve more serious attention. At first the spirit for this purpose was distilled in simple furnace stills, and the materials, that is, husks, lees and wine, were mixed together; hence the product had the unpleasant smell and taste proceeding from the husks burnt at the bottom of the still, and its purification was extremely difficult, so that this cognac ceded to the lower qualities of French cognac. Subsequently, after the publication in 1884 of the regulations respecting the grape spirit industry, the young cognac industry was temporarily put to an end, because owing to the high price of the local wines, and the cost of labour and fuel, it was found to be unprofitable. Therefore the wine growers, who possessed perfected stills, ceased distilling spirit in them, and in order to utilize the refuse obtained in the

preparation of wine, they employed simple stills of the required capacity, that is, not over 30 vedros; and up to now they only distill spirit by this method, and sometimes sell the surplus in the form of a grape vodka, which is sold at the same price as the corn spirits. Thus the production of Russian cognac in the Crimea may be said to have only existed in its infancy, and the production of grape vodka is so small that it has no serious importance in the economy of the district.

Recently, in 1892, the erection of a works for the preparation of cognac from Russian grape wines was begun on the south coast of the Crimea, at Magarach on the estate of Mr. Zhouravlev. This enterprise was the idea of French cognac makers, and wine from Bessarabia was procured to start the works, which were opened in April 1892. The distillery plant consists of two furnace stills of a somewhat perfected construction. The works are managed by a Frenchman having great experience in the preparation of cognac in France. It is too soon to say anything about the possible results of this enterprise. At Warsaw also a distillery has recently been started under the name of «Imperial», for the production of Russian cognac. This firm obtains spirit from the Caucasus, and according to its quality either converts it direct into cognac by filtration, clarification, and mixing it with sugar, or else dilutes the spirit with water, and subjects it to a redistillation and then converts the distillate into cognac, or by diluting it with water, and adding a syrup of sugar or sweet wine, and keeping it in oaken casks. The price of the cognac from the «Imperial» distillery varies between 1 rouble 30 kopecks to 4 roubles a bottle according to its quality. In 1891 to 1892 this firm produced about 147,000° of cognac.

THE PRODUCTION OF YEAST.

The spirit industry is somewhat closely connected with the production of compressed yeast. In some works, known as «yeast distilleries», the preparation of yeast is the chief object, and the spirit obtained from the wort forms a by-product. Besides these distilleries, there are also special works for the production of pressed yeast. The following table gives an idea of the development of the yeast industry since the institution of a tax upon pressed yeast in 1886.

YEARS.	YEAST DISTILLERIES.		YEAST WORKS WITHOUT SPIRIT DISTILLATION.			WORKS FOR TREATING LIQUID BEER YEAST.		TOTAL.
	Number of distilleries.	Production of yeast in pounds.	Number of works.	Production of yeast in pounds.	Number of works.	Production of yeast in pounds.	Number of distilleries and works.	Production of yeast in pounds.
1886—1887 . . .	55	10,620,516	89	799,988	5	55,670	147	11,474,074
1887—1888 . . .	50	13,937,371	65	762,684	3	43,944	118	14,743,999
1888—1889 . .	45	14,723,618	58	708,551	3	70,525	106	15,502,694
1889—1890 . . .	47	15,291,747	45	590,068	3	73,400	95	15,955,215
1890—1891 . . .	49	16,208,722	35	486,410	3	52,312	87	16,747,444

These figures show that, notwithstanding the decrease in the number of works producing yeast, the production increases year by year. This increase must be almost exclusively ascribed to the development of the production of the yeast distilleries, where the yield of compressed yeast increases and makes considerable strides every year. At the works specially occupied in the manufacture of yeast, on the contrary, the production gradually decreases, while at those treating liquid beer yeast it rises and falls, although inconsiderably.

During 1890 to 1891, as has already been mentioned in speaking of the spirit industry, there were 49 yeast distilleries in Russia, instead of 47 as in the preceding year. These distilleries altogether treated 3,053,556 pouds (49,235 tons), of corn stuffs, instead of 2,815,030 pouds (45,390 tons) in 1889 to 1890; including 2,078,608 pouds (33,515 tons) of rye flour, 712,756 pouds (11,492.3 tons) of dry malt, 225,616 pouds (3,638 tons) of maize, 35,312 pouds (569.4 tons) of green malt, 1,264 pouds (20.3 tons) of wheat flour, and 177 pouds (2.3 tons) of liquid beer yeast. Altogether 16,208,722 pounds (14,633,234 English lbs.) of compressed yeast was produced.

The yeast distilleries predominate in the north-western governments, where in 1890 to 1891 there were 18, that is, 36.8 per cent of the total number in the Empire; then come the eastern governments with 8 distilleries, the south-western and central Chernoziom governments with 5 distilleries each, the Baltic governments and Poland with 4 distilleries each, the central manufacturing with 3 distilleries, and the northern and Little Russia with 1 distillery each. The production of compressed yeast is chiefly concentrated in the western zone, namely, in the north-western, south-western, Baltic governments, and Poland, where in 1890 to 1891 31 works, or 61.4 per cent of the total number, produced 11,355,840 pounds (10,252,052 English lbs.), that is, 70.1 per cent of the total production of all the yeast distilleries in the Empire. The largest average production per distillery, however, is not in the western zone but in the central manufacturing region, where it amounted to 1,051,649 pounds per distillery; while in the governments of the western zone it varied between 238,250 and 670,337 pounds (215,074 and 605,180 English lbs.) per distillery.

In 1890 to 1891 there were altogether 35 works for the preparation of compressed yeast without the distillation of spirit, or 10 less than in 1889 to 1890. Owing to so considerable a decrease in the number of yeast works, and in their average output, the production of compressed yeast itself has also diminished.

During the year 1890-91, stores amounting to 79,001 pouds, or 1,273.8 tons, were employed in the above-mentioned works, from which were prepared 486,410 pounds, or 429,130 English pounds, of dry yeast, in place of 590,068 pounds, or 532,713 English pounds, the quantity prepared during the year 1889-90.

The non-distilling yeast establishments are, on the contrary, to be found mostly in the southern and eastern parts of the Empire, especially in the central black-soil zones, where there are ten, whilst in the southern governments there are but seven, and in the eastern, only six. By the manufactories of these three tracts 360,788 pounds of yeast were produced, that is, more than 74 per cent of the entire quantity produced by non-distilling works. The produce of one non-distilling yeast establishment varies from 5,349 to 19,389 pounds, the average quantity amounting to 13,879 pounds, or 12,546 English pounds.

There are in all not more than three dry yeast breweries, two in the Warsaw, and one in the Kovensk government, These establishments employ 7,910 vedros, or

25,707¹/₂ gallons of wet beer yeast, from which are produced 52,312 pounds, or 47,228 English pounds, of dry yeast: that is, in each establishment, 17,437 pounds, or 15,742 English pounds.

The principal materials employed in the production of dry yeast in the chief brandy distilleries are rye flour (68.1 per cent) and dry malt (23.3 per cent); in addition to which as much as 7.4 per cent of maize flour, about 1 per cent of green malt, and a small quantity (0.02 per cent) of wheat flour, are employed. For the most part, the same materials are used in non-distilling yeast works. Thus, they use 87.3 per cent of rye flour, 10.3 per cent of dry malt, 1.9 per cent of maize flour, and about 0.5 per cent of barley flour. The average product of dry yeast from a pound of mash amounts to 5.31 pounds in the yeast distilleries, and to 6.16 pounds per pound in the non-distilling yeast establishments.

According to the tariff actually in force, a duty of ten kopecks per pound is laid on dry yeast, which tax is levied on the band-roll of each packet of yeast. These packets are of two kinds; pound packets, and quarter pound packets. The whole quantity of yeast produced in 1890-1891 by all the yeast distilleries, the non-distilling yeast works, and the manufactories of dry beer yeast, amounted to 16,747,444 pounds, or 15,119,592 English pounds; making in all 11,486,046 pound packets and 21,037,593 quarter pound packets, weighing altogether 5,259,398 pounds.

BEER AND MEAD BREWING.

As far as the use and production of beer are concerned, beer brewing does not occupy in Russia such an important place as brandy distilling. For this reason, the Crown revenue raised from beer brewing, in the way of excise duties and license taxes, amounts to the comparatively modest sum of 5,225,000 to 5,500,000 roubles; whereas brandy distilling, including the manufacture and sale of spirituous liquors, brings in from 250,000,000 to 255,000,000 roubles.

At the same time, it must not be forgotten that, from the earliest period down to the present day, beer brewing has been carried on not only in breweries but also in private houses. Home brewing of beer is largely developed among the peasants; on the principal holidays, church festivals, or at weddings and other festivities, the peasants are accustomed to brew large quantities of beer, exclusively for home consumption, and not for the trade. Beer brewed at home is free from all taxes, and it is, therefore, impossible to give the exact quantity per annum; but there is every reason to suppose that so far from it being less, it considerably exceeds the quantity prepared in breweries.

The production of kvas, the ordinary drink of the Russian people, is carried on to a still larger extent. The difference in preparing beer and kvas mainly consists in this, that the mash for kvas is made chiefly from rye malt, is not boiled with hops, which would prevent lactic fermentation; and hence the mash for kvas undergoes a double fermentation, one acetic and the other lactic. The kvas thus obtained will be found to contain very little alcohol, and to have a refreshing, sourish taste, owing to the presence not only of carbonic but also of lactic acid. In every part of Russia kvas is brewed in private houses, in many of the large towns, and in small breweries especially devoted to its production. Kvas is not subject to

any excise duty. The total quantity of home-brewed beer and kvas, as well as the quantity of grain used in their production, exceed by many times the quantity of beer and mead made in the breweries.

The excise returns show that the largest quantity of beer was brewed in the year 1882, when the duties amounted to 5,807,380 roubles, or 2,988,478 dollars; but the revenue from beer brewing, in consequence of the general commercial stagnation which obtained from the year 1883 till 1887, was reduced by nearly a million roubles, and it is only since the year 1888 that the revenue has recovered a little, though it has never attained to the amount it reached in the year 1882.

In 1891 there were at work in all Russia 1,811 breweries, 52 less than in the preceding year. Such a decrease in the production of beer was shown, not only in the diminution of breweries but in the fall of the excise revenue, which in 1890 amounted to 5,268,758 roubles, or 2,711,303 dollars, whereas in 1891 it amounted only to 5,118,221 roubles, or 2,633,836 dollars. This decrease is to be explained, partly by the bad harvest in the year 1891, and partly by the production of beer being monopolized by a few large breweries. The excise duty on beer up to the 1st of December, 1892, was levied at the rate of 20 kopecks per vedro (a vedro is equal to 2.70 gallons) from each mash vat. From and after that date the duty was raised to thirty kopecks. In fact, during a period of ten years, from 1880 to 1890, the average product of a brewery amounted to 21,060 vedros, or 68,445 gallons; but in 1890 it increased to 25,587 vedros, or 83,158 gallons, whilst in the following year 1891, it further rose to 25,952 vedros, or 84,344 gallons.

The above-mentioned 1,181 breweries are distributed over the districts of Russia according to the following table:

GOVERNMENTS.	BREWERIES.	PER CENT OF WHOLE NUMBER OF BREWERIES.
Poland	249	21.08
Baltic	240	20.32
North-western	215	18.20
South-western	80	6.77
Southern	91	7.70
Central Chernoziom	51	4.31
Siberian, including Turkestan	71	6.01
Eastern	43	3.64
Little Russia	47	4.00
Central manufacturing	34	2.88
Northern	23	1.95
The capitals	17	1.44
Transcaucasian	20	1.70
Total . . .	1181	100

If the whole of European Russia be divided into two tracts, the western and the eastern, seventy per cent of the beer breweries will be found in the first tract, notwithstanding that it is made up of a smaller number of governments, and only thirty per cent in the second; the beer produced is divided in the same ratio. By the official excise returns, and by fixing the average duty, in accordance with observation and calculations, at 16.7 kopecks per vedro, the conclusion is reached that the entire quantity of beer brewed in the year 1891 may be reckoned at 3,648,030 vedros, or 99,616,097 gallons, instead of 32,211,239 vedros, or 104,686,527 gallons, the quantity for the year 1890. The following table of the excise duty, paid at the average rate of 16.7 kopecks per vedro, and the quantity of beer brewed in each of these districts, has been drawn up for the purpose of acquainting the reader with the distribution of this product over the different districts.

GOVERNMENTS.	DUTY PAID.	QUANTITY OF BEER BREWED.	
	Roubles.	Vedros.	Gallons.
Poland	1,097,821	6,573,778	21,364,778
The capitals	1,068,310	6,397,066	20,790,465
Baltic	894,892	5,358,634	17,415,560
North-western.	546,992	3,275,400	10,645,050
Southern	431,728	2,585,200	8,401,900
South-western.	218,286	1,307,100	4,248,075
Central manufacturing	192,978	1,155,556	3,755,557
Eastern	172,275	1,031,586	3,352,658
Central Chernoziom	129,337	774,473	2,517,037
Little Russia	110,512	661,747	2,150,678
Northern	93,853	562,000	1,826,500
Siberian, including Turkestan	93,796	561,652	1,825,369
Transcaucasian	67,444	403,838	1,312,470
Total.	5,118,224	30,648,030 *	99,606,097

Thus it is seen that, in the western tract, where the largest number of breweries is to be found, 54 per cent of the beer brewed in European Russia is produced; and this percentage will be considerably increased, if in this tract the Petersburg government be included. The Baltic and Polish districts and the capitals form the centres of this industry, such as Riga, Warsaw, Petersburg, and also Moscow. The large breweries are the chief suppliers of the beer market, and are able to hold their own against any local provincial competition. The quantity of beer produced depends for the most part, not so much on the size or extent of the brewery, as on the num-

* As may be seen from this table, the quantity of beer, excluding home-brewed, and reckoning the population of Russia at 120,000,000 inhabitants, consumed annually per head amounts to about $\frac{1}{4}$ vedro, less than is consumed in most of the European states.

ber of breweries in one or another of the tracts. Taking the average extent, the product of each brewery in a tract is found to be distributed according to a scale quite different to what would be the result if the total quantity of beer brewed were taken. In the returns for the year 1891, they are arranged in the following order.

GOVERNMENTS.	DUTY PAID, BY BREWERIES.	QUANTITY OF BEER BREWED.	
	Roubles.	Vedros.	Gallons.
The capitals	62,841	376,293	1,222,952
Central manufacturing	5,675	34,000	110,500
Southern	4,744	28,407	92,323
Poland	4,408	26,400	85,800
Northern	4,080	24,431	79,400
Eastern	4,006	24,000	78,000
Baltic	3,728	22,323	72,550
Transcaucasian	3,372	20,191	65,621
South-western	2,728	16,335	53,089
North-western	2,544	15,234	49,510
Central Chernozom	2,487	14,892	48,399
Little Russia	2,360	14,131	45,726
Siberian, including Turkestan	1,321	8,000	26,000

The Petersburg and Moscow governments form the most striking exception, where, in spite of the small number of breweries, seventeen in all, a very large quantity of beer is produced; and consequently, in respect to the total quantity of beer brewed, these two governments occupy a prominent place.

The chief and principal material, barley, used in brewing beer, is all of Russian growth. The best sort of barley comes from the Polish, western, south-western, and Baltic governments. The barley grown in the Saratov and Tsaritsin governments is also much sought after.

The second important material employed in Russian breweries, hops, is partly imported, chiefly from Bohemia and Bavaria, and partly of Russian growth, the Volynian being preferred. The difference in price of Volynian and foreign hops varies from three to twenty-five roubles per poud; but so-called local hops are sold from fifteen to twenty per cent cheaper than hops of foreign growth. At the present time Volynian hops are gradually forcing foreign imported hops out of the market. Thus, for example, in the principal breweries of the Samara government, till a quite recent period, foreign hops were exclusively used; whilst in 1890 a very small quantity of them was imported, to mix with home-grown hops, bought for the most part in the Volynian and Podolsk markets. The same thing is noticed in the government of Kovno, where Volynian hops, thanks to the yearly improvement in their quality, are preferred to the foreign; the latter, even in the best breweries and for the production of beer of the highest quality, being mixed with home-grown hops in the pro-

portion of about 30 per cent. There are good reasons for believing that very often in the Empire, Russian hops are sold and passed off for those of foreign growth. Some of the breweries have already begun to have their own hop plantations. Among such may be mentioned the Oukrainka brewery in the Kharkov government. But there are breweries in the Volynian government that use only wild hops.

According to the sorts of beer produced in the Russian breweries, malt grinding and mash clearing are effected by different processes: by decoction (Bavarian), by infusion (English), or sometimes by a slightly varied application of these two principal methods.

The kinds of beer made in Russia may be classified under three principal groups. Firstly, the best sorts: porter, export, bock beer, Munich beer, Vienna beer, et cetera; secondly, Bavarian beer; thirdly, simple or half-beer. From a poud of ground malt are produced on an average about 4.9 vedros of beer of different qualities, or from 100 English pounds of malt, 44.3 gallons. In the St. Petersburg breweries the product of a poud of malt amounts from two to three vedros of porter and export of the finest quality; elsewhere, as in the Chernoziom, north-western, and Little Russia governments, from 2.7 to 3.5 vedros are produced, and in the Baltic governments, where the mash is thin, as much as 4 vedros. In consequence of this difference in produce, the amount of the duty levied per vedro of beer varies considerably, ranging from 16 $\frac{1}{4}$ to 31 kopecks, and in the St. Petersburg breweries, from 32 to 38 kopecks per vedro. The Bavarian beer gives nearly everywhere the same result, about 4.5 vedros, the only exceptions being, first, the Baltic and north-western governments, where a weak mash is produced, with a result of 5.2 vedros; and secondly, the Chernoziom governments, where on the contrary a very thick mash is produced, giving in all about 3.7 vedros of beer. Conformably to this, there does not seem to be any great variation in the proportion of the duty levied per vedro, which in general amounts to about 20 $\frac{1}{4}$ kopecks. In the production of common beer great variations in both respects are to be noticed. In the central, eastern, and in some of the Little Russia governments, with a result of 3.7 vedros, a duty of from 31 to 24 kopecks is levied per vedro; whilst in the Baltic governments, with a result of 10 vedros, the duty does not amount to more than 13.3 kopecks; in the Polish governments, with a result of 6.7 vedros, the duty comes to 10.7 kopecks; and in the north-western governments, with a result of 6.6 vedros, the duty is 12.6 kopecks.

Though not so intimately connected with rural and farming economy as brandy distilling, the production of beer is none the less the source and cause of sale of many farming and country products, and contributes greatly to the development of one particular branch of rural economy, the growth of hops. Hop cultivation becomes a matter of considerable importance, in as much as with every improvement in the culture and dressing of hops, the breweries are freed, if not altogether, at least to a large extent, from the necessity of being supplied with this valuable product by foreign markets.

In distinction from beer brewing, the brewing of mead is gradually falling off. There were in all Russia, in 1891, 526 mead breweries at work, and of these only 219 were specially devoted to the production of mead, the remaining 307 forming but branches of beer breweries. All these establishments were distributed over the different governments of the Empire according to the following tabular return:

GOVERNMENTS.	NUMBER OF BREWERIES.		TOTAL.
	For mead.	For mead and beer.	
Poland	76	—	76
Baltic	18	78	96
North-western	70	5	75
South-western	26	11	37
Southern	6	31	37
Central Chernoziom	6	34	40
Siberian, including Turkestan	—	19	19
Eastern	1	30	31
Little Russia	6	31	37
Central manufacturing	3	29	32
Northern	—	22	22
The capitals	7	15	22
Transcaucasian	—	2	2
Total.	219	307	526

The average amount of duty paid by these mead breweries is excessively small. Thus, in 1891, the duty paid by all these 526 breweries amounted to 22,128 roubles, giving for each brewery the average sum of 42 roubles; and this in the preceding year, 1890, was still less, being only 39.5 roubles. But it must not be forgotten that the amount paid by the different breweries varies to a considerable extent, in some places greatly exceeding, and in other places falling below, as much as one half or even more, the normal sum. In the Petersburg and Moscow governments the average rate of duty paid may be reckoned at 162.27 roubles; in the north-western, not more than 31.85 roubles; and in the central manufacturing districts still less, 30.37 roubles. What an unimportant place these mead breweries occupy among the industrial establishments of Russia is further shown by the fact that in the greater number of them, especially those forming mere branches of beer breweries, nothing more than small vats for mead brewing are found; whilst in many of them there will not be more than one or two brews in the course of the whole year. The special mead breweries are for the most part located in the Polish and north-western governments, where there are altogether 146, that is, 67 per cent of the whole number in all Russia. The mead branches of beer breweries are chiefly concentrated in the Baltic governments, where there are 25, that is, 4 per cent of the whole number, and in the central Chernoziom, Little Russia, eastern, and central manufacturing districts.

The principal material used in brewing mead is not honey, but sugar, seasoned with different sweet spices. It is only in some of the breweries of the western and Polish governments that pure honey is employed.



CHAPTER XIX.

Tobacco Industry.

THE manufacture of tobacco goods is one of the industries, the products of which are in Russia liable to excise duties. This duty is levied by means of band-rolls, of which there are two classes: the higher band-rolls used for all superior sorts of tobacco goods, and the lower band-rolls for *makhorka* and other less expensive kinds of tobacco products. During the period of five years, 1881 to 1885, there were 345 tobacco manufactories in all Russia; during the following five years, from 1886 to 1890 there were 343, and in the year 1891 there were 323. Of the 323 manufactories which were at work in 1891, 187, or 58 per cent of the whole number, produced tobacco goods of the higher quality, and 136, or 42 per cent, *makhorka* and tobacco goods of an inferior quality. Moreover, to 54 establishments of the prime class were attached branches for the preparation of cheaper and inferior tobacco goods. The total quantity of products prepared by all these tobacco manufactories in the course of the year 1891 amounted to 3,539,500 pouds, of which 944,500 pouds were given out under higher band-rolls and 2,594,800 pouds under the lower.

In the preparation of goods of both kinds, tobacco of Russian growth was principally employed. Thus, in the year 1891, not more than 1.6 per cent of the tobacco used in the Russian manufactories was imported. The use of foreign tobacco is thus limited, not only in consequence of the heavy duty laid upon it, but because in the present day there is no lack in Russia itself of raw material of the very finest quality. Such can easily be obtained from the Crimea, Bessarabia, and the Caucasus. In the manufacture of the higher kinds of tobacco goods, the sorts of Russian tobacco most in use are, the Trebisonde, the Samson, and the South Coast, from the Crimea. Formerly, Bessarabian tobacco was in great demand, but it has gradually lost the preference it once enjoyed, from the time that culture of tobacco became so widely developed in the northern districts of the Caucasus.

The development of the manufacture of tobacco goods, the excellency of which depends, to a much larger extent than is the case with any other branch of com-

mercial industry, on the quality of the raw material employed, is but slightly aided or promoted by the progress of mere technical knowledge. The manufacturer of tobacco products has mainly to take care that the raw material supplied to him be well and properly sorted, and that any damage it may have incurred whilst in store be made good.

Although in Russia cigarettes, or *papirosi* as they are always called, are in much greater use than either pipes or cigars, tobacco nevertheless forms the main article of manufacture, since most smokers prefer to prepare their *papirosi* at home for themselves, and for this purpose employ ready made cigarette-paper rolls or cases. The tobacco products prepared during the year 1891 in all the manufactories, and given out under the higher band-rolls may be classified in the five following groups:

Tobacco 1st, 2nd, 3rd quality	714,300 pouds
Snuff	700 »
Cigars 1st, 2nd, 3rd quality	65,300 »
Cigarettes 1st, 2nd, 3rd quality	163,400 »
Small cigars	800 »
Total	944,500 pouds.

The quantity of *makhorka*, and other inferior tobacco products, given out under the lower band-rolls, amounted in 1891 to 2,594,800 pouds. Of this total quantity 2,068,200 pouds were employed for the manufacture and preparation of smoking *makhorka*, 284,100 pouds for snuff *makhorka*, and 240,300 pouds for dry *makhorka*. The enormous preponderance of *makhorka* over all other tobacco products may easily be explained by the wide and general use of this kind of tobacco among the peasant classes of the country.

The more active centres of tobacco manufacture in Russia are not to be found, as might be expected, in the main central tracts of its produce and culture. Thus, the Chernigov and northern Caucasian districts form the chief Russian tobacco plantations, but they occupy a very low rank among the tobacco manufacturing districts of Russia. In other governments, which hold a high place among the tobacco-growing tracts of Russia, is noticed also the same disparity, if their tobacco industries be compared with those of the Petersburg, Moscow, Warsaw, Lithuanian, Kiev, and Yaroslavl governments, or the Don provinces. In general, the manufacture of tobacco has become domiciled and greatly developed in those places where other manufacturing industries have attained considerable dimensions. At the same time it is necessary to remark that it is by no means distinguished by the same traits in the different tracts. In some places, *makhorka* products alone are prepared on an extensive scale, whilst frequently in the neighbouring districts only cigars are manufactured in large quantities, and elsewhere is found tobacco of the finer qualities, and *papirosi* forming the staple article of production. In only a few of the more central cities, such as St. Petersburg, Moscow, Warsaw and Riga, are tobacco products of all kinds manufactured, since these goods are prepared for a large and varied circle of both local and provincial smokers, whose different tastes and demands have consequently to be satisfied and supplied.

The central manufacturing governments occupy the first place in the tobacco industry. In these governments, 56,100 pouds of tobacco goods were in 1891 prepared and sent out under the higher band-rolls, and 708,800 pouds under the lower band-rolls. The quantity of each particular sort of tobacco goods there manufactured is set forth in the following table:

1. Goods issued under the higher band-rolls:

Tobacco	36,200 pouds
Snuff	500 »
Cigars	2,800 »
Cigarettes	16,500 »
Little cigars	100 »

2. Goods issued under the lower band-rolls:

Makhorka tobacco	576,100 pouds
Makhorka snuffs	111,200 »
Dried makhorka	21,400 »

As may be seen from the above returns, the tobacco industry of the central manufacturing governments is dependent on the extent to which it meets the demands and tastes of the humbler classes. For this reason, there is a large manufacture of tobacco of inferior qualities, particularly *makhorka* and *makhorka* snuff, chiefly in the Yaroslav government, whilst the manufacture of cigars is limited, and the preparation of tobacco for *papirosi* is by no means large. It may be added that only in the Moscow government are all these kinds of tobacco goods alike manufactured.

So far as the various kinds of tobacco products are concerned, there is but little difference to be noticed between the central manufacturing governments and the central Chernoziom, the Little Russian, the south-western and the eastern governments. The principal point of difference is that in the latter, cigars are not manufactured at all. An idea of the extent and distribution of this industry over all these four governments may be formed from the following table:

	Central Chernoziom.	Little Russia.	South-western.	Eastern.
1. Tobacco	4,500	51,000	88,300	900 pouds
Cigarettes, or <i>papirosi</i>	1,100	4,400	6,200	700 »
2. Makhorka tobacco	536,400	317,900	110,000	98,200 »
Makhorka snuff	37,800	35,200	9,500	100 »
Dried makhorka	8,500	10,000	3,300	43,300 »

In all these four governments, the staple article of tobacco manufacture is *makhorka*, and this is much developed in the central Chernoziom, and in the Little Russia governments.

The manufacture of *makhorka* goods has also the preeminence over all other tobacco products in the north-western and Baltic governments, as well as in the dis-

tricts on the Vistula. But in all these places the influence of Western European tastes is felt; for together with *makhorka* goods a considerable number of cigars is manufactured, especially in the Vistula districts, whilst the manufacture of tobacco and cigarettes is more limited, particularly in the last two provinces. Thus, in 1891 were prepared:

	North-western.	Baltic.	Vistula.
1. Tobacco	13,600	9,100	10,800 pouds
Cigars	12,300	15,100	24,900 »
Cigarettes, or <i>papirosi</i> .	13,200	700	6,600 »
2. Makhorka tobacco . . .	285,400	39,500	71,000 »
Makhorka snuff . . .	37,900	800	5,100 »
Dried Makhorka . . .	72,900	63,800	2,800 »

It is quite different with the southern and Transcaucasian districts, where the manufacture of superior tobacco goods, issued under the higher band-rolls, assumes considerable proportions, coupled with a complete absence, so far as the southern districts are concerned, of the manufacture of cigars. According to the returns for 1891, the manufacture of tobacco products was thus distributed in these places:

	Southern districts.	Transcaucasian districts.
1. Tobacco	268,300	45,000 pouds
Cigars	—	100 »
Cigarettes, or <i>papirosi</i> .	26,000	12,300 »
2. Makhorka tobacco . . .	15,500	6,600 »
Makhorka snuff . . .	300	—
Dried Makhorka . . .	3,800	800 »

In both these districts the manufacture and preparation of *makhorka* goods occupy a prominent place among the local industries. The manufacture of the finer kinds of tobacco is mainly concentrated in Rostov-on-Don, where there are numerous extensive manufactories that have long acquired a solid reputation for the high quality of their goods.

In the northern districts, including the Petersburg government, tobacco goods of the finer qualities, and issued under the higher band-rolls, are also more largely manufactured than tobacco goods of the lower and inferior sorts. But it is to be noticed that at the same time a greater percentage of cigarettes and also cigars is produced in these districts than is the case in the southern governments. Thus, in the year 1891 were manufactured:

1.	2.
Tobacco 183,300 pouds	Makhorka tobacco 9,400 pouds
Cigars 10,200 »	Makhorka snuff . 50 »
Cigarettes, or <i>papirosi</i> . 75,400 »	Dried makhorka . 9,800 »

The principal Russian tobacco manufacturers, Bogdanov and Company, have their works at St. Petersburg, and in the year 1891 paid on their band-rolls 2,000,000 roubles.

Only a small proportion of tobacco goods of the finer qualities is imported into Russia; the demand is gradually falling off, and as Russian tobacco manufactures are now generally valued for their cheapness and good quality, they are each year commanding a larger export. The following table will be found to give all the necessary data as to the exportation and importation of tobacco goods for the years 1883 to 1886, and 1887 to 1890:

	Tobacco.	Cigars.	Cigarettes.
1883--1886 imported:	3,345 pouds	2,367 pouds	—
1887--1890 »	3,857 »	1,553 »	—
1883--1886 exported:	4,367 »	290,721 pieces	18,205,000 pieces
1887--1890 »	6,848 »	155,925 »	30,587,000 »

From the above returns it will be seen that the importation into Russia of tobacco has slightly increased, and that of cigars has decreased 34.4 per cent during the second period of four years; whilst the exportation of tobacco has increased 56.8 per cent, and the exportation of cigarettes 68 per cent; and it is only in cigars that a general falling off is remarked.



CHAPTER XX.

Food Products.

GRAIN FLOUR AND GROATS.

THE preparation of flour in Russia was for a long while strictly limited to local necessities, and was practised with the sole design of meeting the requirements of a small circle, or district. It was easy enough to satisfy the modest tastes and demands of the consumers of flour, chiefly of rye, and mills were in earlier days furnished and worked in a most primitive fashion. The grain was often ground without having been first cleaned, and was afterwards but seldom well sifted. The millstones were put into motion either by oxen, or still oftener by the simplest types of water and wind power. Even to the present day there are to be found many similar mills, and in some places flour is still prepared by means of hand millstones. Nor will this in any way excite astonishment, if the extent of the Russian Empire be taken into consideration, with its varying degrees of wealth and development, and the constant incorporation into it of new and uncultivated tracts, where its civilizing activity finds a new scope and sphere.

Concerning the progress and development of the grain-grinding industry, it must be remarked that no official data exist to supply the necessary materials for information. The primary articles of daily life are, with very few exceptions, in this country free from all direct taxation; there are no taxes on millstones, or on ground products, nor are there any taxes of that class, as is the case in many countries. There is consequently no urgent necessity for regular returns of such products. There are, therefore, either no returns at all, or such as there are, till within a very recent period, were made loosely and without accurate verification.

It is certain that the grinding trade first began to occupy a place of any importance among the commercial industries of Russia towards the end of the first quarter of the present century. It was then that American improvements in the construction of mills were introduced into this country; the first to make such improve-

ments being the well-known millwright, Oliver Evans. By the introduction of these mills, which were long known as American, the expense of grinding grain was considerably decreased, a smaller number of hands being employed, and the heavier part of the work being performed by machinery. This led to the construction of mills of greater power, and to a consequently increased commercial activity in the purchase of grain, and in the sale of flour.

Till the middle of the present century, the larger mills, with scarcely an exception, were worked by water, and were constructed near commercial and trade centres on the shores of the more important rivers, where it was easy to obtain grain and to transport flour. Both then and in earlier times, it is noticed the corn-grinding industry mainly flourished in the upper districts of the Volga and its affluents. These streams have, to the great advantage of Russian trade, been since united to the Baltic by means of canalization. In these upper districts of the Volga, from an early period, the trade and commerce of every kind took a firm root; and, though not a wheat-growing tract, these districts have long been the central markets of the wheaten flour industry, the grain being brought thither from the lower districts of the Volga.

With the introduction of steam machinery, and the enlargement of the chain of railways, mills of a larger size, and with greater working power, began to be built, chiefly for grinding wheat, both in the upper and in the lower districts of the Volga; they were also constructed along the lines of railroad running to Moscow and passing through the fertile regions of central Russia. A little later we find them in the governments lying on the Black Sea and on the Sea of Azov, near the port towns of those seas, as well as along the roads leading from the western zone of the black-soil tract to the Baltic Sea.

For some years the employment of steam as a motive power in the mills made slow advance, but later became more and more quickly adopted. According to some semi-official returns, published in 1887, of all the mills at work in European Russia up to the year 1845, there were only three worked by steam.

In the period of 4 years from 1846 to 1850 there was built								1
»	»	»	»	1851	»	1855	»	1
»	»	»	»	1856	»	1860	there were built	11
»	»	»	»	1861	»	1865	»	20
»	»	»	»	1866	»	1870	»	25
»	»	»	»	1871	»	1875	»	58
»	»	»	»	1876	»	1880	»	68
»	»	»	»	1881	»	1885	»	141

If the official reports of the actual condition of the corn-grinding industry in Russia be taken into consideration, there is every reason to conclude that the construction of mills worked by steam has been pushed forward with even more rapidity than is set forth in the above-cited table.

In general at the present day, the preparation of flour has begun to assume more and more the character of a manufacturing industry, and the manufacture of wheaten flour has in the last fifteen years become a highly important branch of

commerce. The rapid development of the flour trade is in close connection with the technical changes made at the same time in the grinding of grain by the introduction of rolling wheels, and numerous other improvements in mill machinery and apparatus, as well as in the construction of mills. It should be mentioned that the Russian millers, in proceeding to the construction of large steam rolling mills, not seldom with the automatic march of the grinding wheel, soon became convinced of the profit to be made out of such improvements, and gladly adopted them. Without seeking new markets for the sale of flour, they continued to increase the number of new mills, and to augment the productive power of those already existing. Between the years 1875 and 1880, millers brought on a commercial crisis by manufacturing in excess, and some were compelled to work less, whilst others became quite insolvent. The crisis was felt most acutely by some of the merchants who they had constructed mills, reckoning on obtaining easy credit; and credit, owing to certain circumstances connected with the administration of several of the private banks, could not be obtained except for very short terms and with great difficulty. Another unfavourable circumstance with which the new steam rolling mills had for a while to contend was that buyers, having become acquainted with the good qualities of wheaten flour, and the way in which it should be prepared, began to show complete indifference to wheaten flour of an inferior quality, which consequently remained unsold and accumulated from year to year.

These accidental circumstances have now ceased to have any influence; the supply is more carefully regulated by the demand, and wheaten flour prepared in the larger steam roller mills has opened up for itself new markets; the monetary crisis has passed; and the different kinds of flour are produced in measure with calculated profits of sale. As a rule, the production of wheaten flour is becoming more and more concentrated in the larger mills, the number of which is being constantly increased, not as before from an artificially forced activity, but with far more judgment and caution.

In proceeding to speak of the manufacture of flour, it may be remarked at the outset that it is chiefly prepared from rye and wheat. There are many different kinds of rye grown in Russia, and these are generally called after the particular place of their growth. The heavier sorts of rye (from 8 pounds 8 pounds to 9 pounds 25 pounds per chetvert, or from 49.70 to 56.48 Englis hpounds per bushel) are mostly sent abroad, and the lighter sorts are used for making rye bread, which is so generally eaten throughout Russia.

Rye flour is in Russia generally prepared by simple grinding. The commonest sort, known under the name of *ordinary rye*, is obtained by one light grinding of the grain; and without any further preparation, but it is bolted, if it is sent off for sale. The middle sort of flour, called *peeled rye flour*, is obtained by the grinding of more carefully cleaned, peeled, and shelled grain, the hulls being sifted off, but the ground product is not sorted. The superior sort of flour, called *sifted rye flour*, is distinguished from the middle sort by the ground product of cleaned and shelled grain being subjected to careful sifting.

For grinding rye a set of upper and nether revolving stones is generally used, and a set of vertical mill wheels is seldom seen after the type of the Umfried wheels. The use of rollers for the grinding of rye is limited, being sometimes em-

ployed for the first grinding of sifted flour, in which case the rollers are smooth or furrowed, the subsequent grindings being made with smooth-surfaced millstones. For bolting, the ordinary sifting apparatus are employed, but in a few mills rotary sieves are met with.

In mills for the preparation of the finer sorts of rye flour about 80 per cent of the grain weight is secured, but in general a somewhat larger proportion of flour is obtained. The Russian people are so accustomed to black rye bread, that they prefer it to the white, not only because the latter is dearer, but because it lacks the peculiar taste and odour which the people affect, and of which, according to the common saying, «no man grows tired or can have too much of». As in estimating the quality of food products, the personal experience of the consumer must be regarded as the best guide, and by which the market demand and price are chiefly regulated, it must be confessed that there is no sufficient reason for employing any but the simplest modes of grinding rye, for procuring flour that shall be as free from bran as possible. But it is none the less necessary to develop the general use of sifted flour that shall not contain any large quantity of husk, in consequence of the necessarily bad quality of the bread made from such flour. An evidence of the kind of grinding most in use in Russia is seen by taking as an example the flour employed for the troops. The average quantity of bran sifted in a sieve of 400 meshes in each square inch amounts to 3.45 per cent, which gives about 10 pounds of bran for 290 pounds of flour.

In the flour trade and in the mill products two kinds of wheat are mostly used: the heavy (*triticum durum*), and the light *triticum vulgare*, but these groups represent many varieties, whose denomination has not as yet been definitely established. To hard wheat belongs first of all the *arnaoutka*, grown in the south, and frequently called *garnovka*; then follows the hybrid *arnaoutka* sown in the regions of the Volga, and called *bielotourka* if it comes from the sloping banks of the river, and *kubanka* when cultivated on the hillsides. Of the soft wheats, the first place must be assigned, in the south, to the *girka*; in the vicinity of the Volga, to the *russak*, or Russian wheat, and to the *saxonka* (saxon wheat); and in the western government, to the *sendomirka*. In trade each of these and other kinds of wheat are classified as high, medium, and low; which are further subdivided and either numbered, or designated by the names of their place of growth. The soft wheats are successfully exported, whilst Russian mills mostly grind a mixture of hard and soft wheats.

In the Empire, wheat flour has always been manufactured with great care, in order to obtain the highest quality, and as free from bran as possible. The Russian people are not very exacting with reference to rye flour, and put little value on its colour; but they are very particular as to the quality of wheat flour. In Russia the wheat is carefully cleaned and sorted before grinding. Russian millers pay particular attention to the separation of the kernel from the hull, and to the removal of the germs. Cleaning mills and hulling machines are often brought from America, especially the Howe hulling machines, although they are mostly used together with the local machine for hulling grain, and which consists of two hollow cones, the one fitting into the other; their working surfaces are covered with perforated iron sheets. The grain is passed between the surfaces during every rotation of the inner cone. The hulling is completed by sending the grain between two millstones at the proper

distance apart, and through a brush finishing machine, to obtain the remaining fragments of the hull. To prevent the pulverization of the hull and of the films that may still cling to the kernel outside or inside in the germinal furrows, it is slightly moistened before grinding. The part of the mill where all these operations are performed is generally separated from the rest of the building by a fire-proof wall; in some recently constructed mills, the separators and other machinery for the preparation of the grain for grinding are kept in different buildings, to insure them against danger from fire.

The usual method followed in Russia for making wheat flour consists in the preparation of groats, and their successive grinding into fine flour. In the first place the groats are separated from the meal dust, breaks and middlings, that always result from the process. The flour that falls off in this process is considered as the lowest quality, containing as it does a considerable amount of glume particles; however great the care taken to prevent their pulverization, it cannot be completely avoided. The breaks and middlings are separated from the bran, and sorted according to size and density by passing them through a strong aspirator. The highest quality of flour is obtained from the heavier and denser middlings and breaks, which are finely ground and passed over several purifiers. The medium quality flour is made from the lighter and non-friable middlings that come, not from the centre of the kernel but from near the surface, and which, according to the nature of the grain, are much darker than the central particles. The last reduction of the groats leaves behind the breaks of the hull, which being once more ground give the coarse and fine bran, as well as a very dark flour.

This method of grinding is since long ago practised in Russia, and is called *kroupchaty* or *kroupichaty* (made of groats) because the groats play a conspicuous part in this method of grinding. The mills which work according to this process are called *kroupchatki*. The production or working of groats, called *dranié* (peeling), in these mills often undergoes seven different processes. The newly constructed mills use for the work, sets of fluted rollers, the most popular of which are those with two pairs of rollers, the axes of which are disposed in one common horizontal plane. The sets of rollers from Genz's manufactory in Buda-Pest, with tempered cast iron rollers from Gruson's in Magdeburg, are those that enjoy the largest sale. When fluted rollers are substituted for common millstones the amount of flour-dust falling off by the reduction of middlings is diminished; in consequence a larger quantity of mealy particles is reduced to breaks and middlings, and a greater proportion of flour of high quality is obtained.

The groats are sifted by means of systems or groups of prismatic sieves; centrifugal sieves are seldom used; flat sieves, especially the Haggenmacher of Pest, are more often met with. Fanning mills for assorting and cleaning middlings are of different kinds. Amongst them are many American makes, especially the Smith purifier.

The grinding of purified breaks and middlings is done with ordinary millstones, or with smooth, sometimes even porcelain, rollers. These sets often consist of three rollers fixed one above the other (Mechwart and Daverio system); their combined work is the same as that of two pairs with axes disposed on the same plane. Sometimes sets of the latter system are used, especially the *Victoria*, with two porcelain rollers, patent of Wegmann in Zurich.

Sieves of the same type as those employed for groats are used for sifting breaks and middlings, but, of course, their meshes are different. Centrifugal sieves are also employed. The grinding of the residues from the last reduction of groats is done by passing them between ordinary millstones; they are sifted afterwards by means of the above-mentioned appliances. In Russia large and medium mills, *krouptchatki*, are five stories high; the smaller ones have only three or four stories. Many of them are lighted by electricity. On the Volga and its tributaries the mills have boilers heated with naphtha refuse; in the southern regions, coal is used as fuel. and in the northern, wood.

The work and the value of the production of Russian mills may be estimated by the successive amounts of the feed (*peredel*). In proportion to the power of the mill the feed amounts to 120, 1,200, and 2,000 pouds; or, in other numbers, to 72, 720, and 1,200 bushels.

In Russia the mills of the old system grind 9 sorts of flour, and 2 of bran. Such mills produce 40 per cent of the highest quality of flour, the so-called *krouptchatka*; this is sometimes subdivided into *confectionery* flour, *otyemnaya*, and real *krouptchatka*. The second quality is called *pervach* and amounts to 28 per cent of the whole production; it is divided into *first pervach*, *drannaya* (peeled) and *second pervach*. The worst quality of flour (16 per cent) is called *koulichnaya*, subdivided into three sorts: *podroukavnaya*, *koulichnaya* and *mezheoumok*. Bran, coarse (*shapsha*), and fine (*messiatka*), forms 14 per cent; and loss, 2 per cent.

The mills of recent construction do not grind so many varieties of flour. Some of them cling to the old methods only to a certain extent; the greatest part of them introduce their own marks, figures, symbols, and brands. For instance, in some mills on the Volga the various kinds of flour are called: 1st quality, No. 0; 2nd quality, No. 00; 3d and 4th qualities, *pervach*; 5th quality, *drougach*; 6th quality, *vyboika*; others grade, as follows: 1 A blue stamp, 1 B red stamps, 2 A blue stamp, 2 B red stamp, 2 C black stamp; 3d quality, 4th quality, and forage. The quoted examples do not by any means comprise all the existing brands; it must be admitted that Russian millers do not as yet possess a definite system of denomination and classification of their products. The table on page 354, which shows the percentage of flour of different sorts in the successive orders as they are issued from the separate mills, may give an idea of the quality of flour produced by Russian millers *.

The figures quoted in this table concern the mills that grind for the most part hard and soft wheats intermixed, such as *pererod* (hybrid of arnaoutka) with *russak*; of the soft wheat only one-quarter to one-third of the whole quantity of grain is taken. The mills of the last two columns are stated as giving only four sorts of flour; in reality the first and second qualities are subdivided, so that 6 grades are obtained. Some of the mills, as the table shows, produce a greater quantity of first grade flour than of the second, while others show the reverse. This fact may be explained by the demands of the local markets. The great percentage of bran given

* The facts on which this table is founded have been taken from an essay of A. Klopov; «Description of the milling production in the region of the Volga (Povolzhie)», and from the data given by several millers.

for some of these mills, is due to the high prices thereof. The cost of the grinding, as declared by the millers, varies from 0.75 to 1.50 roubles paper per chetvert, or, approximately, from 25 to 50 cents per six American bushels. Although some of the proprietors reckon the cost of grinding higher, however, it may be estimated at an average price of 10 kopecks per poud of wheat, or 5 cents per 36 English pounds.

S O R T S.	PERCENTAGE OF FLOUR OF DIFFERENT QUALITIES AND BRAN PRODUCED BY MILLS NEAR:									
	Rybinsk.	Yaroslav.	Kostroma.	Nizhni-Nov- gorod.	Kazan.	Samara.	Orenburg.	Saratov.	Livno.	Yelets.
1st quality flour. .	27.50	23.33	23.00	39.17	20.83	19.17	16.67	16.66	15.66	15.50
2d » » . .	12.50	16.66	13.50	29.17	30.00	40.83	41.67	10.00	39.58	39.50
3d » » . .	25.00	14.17	19.75	6.67	15.00	11.66	15.00	18.75	8.75	9.00
4th » » . .	9.20	12.50	13.00	4.17	9.17	4.58	6.67	14.58	4.58	4.75
5th » » . .	3.30	6.67	5.25	2.50	4.17	4.58	3.33	10.41	—	—
6th » » . .	1.70	5.83	4.30	—	—	—	—	8.33	—	—
7th » » . .	—	4.17	2.10	—	—	—	—	2.91	—	—
Bran	18.80	15.00	16.10	16.66	16.66	16.66	16.66	16.16	27.66	27.50
Waste	2.00	1.77	3.00	1.66	4.17	2.52		1.90	3.75	4.75
Total. . .	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

The large mills in Russia seldom take orders for grinding; they buy the grain and sell their own flour. Every mill has its own valuation for its flour of various sorts. Some of the millers producing 6 sorts of flour settle the difference between the prices of the 1st and 2nd quality at 20 kopecks (paper value) per poud, or 10 cents per 36 English pounds. Almost the same difference may be adopted for the 6th quality and the bran. The difference between the 2nd and 3d, and 3d and 4th qualities is almost double that between the 5th and 6th, three and three and a half times as great as that between the flours of the best qualities. The absolute market price of flour depends upon the price of the wheat, and the cost of its transport to the mills, and of its grinding, upon the position of the market, and upon various commercial combinations. In every case the Russian millers enjoy such considerable profits as can scarcely be received from such operations in foreign countries. The production of flour from other cereals, husk plants, and potatoes is inconsiderable, owing to the small demand therefor.

The general condition of the more firmly established part of the milling business in Russia may be seen from the following official data for 1889 and 1890.

LOCATION OF MILLS.	The number of mills.	MOTORS AND THEIR POWERS.				Number of hands.	Production in tons.	Value in millions of roubles.
		Water.	S t e a m.					
		Number of motors	Number of motors.	Number of powers.	Number of boilers.			
1889.								
European Russia .	5,073	5,429	887	15,984	930	24,360	2,118,050	152
Poland	516	593	76	1,966	82	2,090	128,143	10
Caucasus	337	531	72	760	76	1,183	72,127	5
Siberia	515	143	18	335	15	1,562	67,068	6
Turkestan	158	10	1	6	1	261	17,521	1
Total . .	6,599	6,706	1,054	19,051	1,104	29,456	2,402,909	174
European Russia .	5,605	7,972	711	15,742	814	25,085	2,168,342	137
Poland	591	580	72	1,791	113	2,081	165,665	11
Caucasus.	416	844	58	788	64	1,061	56,650	4
Siberia	234	216	20	393	23	1,050	47,953	3
Turkestan	157	11	1	6	1	361	23,957	1
Total . .	7,003	9,623	862	18,720	1,105	29,638	2,462,569	156

Of the administrators, such as have received a technical education, there were in 1889: Russians, 35; foreigners, 20; such as have had no special technical education, 4,329 Russians, and 69 foreigners; in 1890 there were: Russians with technical education, 42; foreigners, 25; without such education, Russians, 6,914; foreigners, 106.

In the figures, 2,462,569 tons of the total production for 1890, 136,790 tons of bran obtained by millers in different provinces, with the exception of Turkestan, according to official data are included. The greater number of mills in 1890, as compared to that in 1889, is explained by the fact that some of the farm mills have been declared commercial undertakings; the decrease in the number of steam engines and boilers in 1890 is explained by the circumstance that in 1889 many of the small mills organized at other works and manufactories are represented as possessing motors of their own. The grinding mills of the Department of War, providing the Russian army with flour, must be reckoned in the number of those firmly established and well equipped. There are sixteen such mills; of these 14 are moved by steam engines, yielding on the whole 1,110 horse power, and 2 have gas motors yielding 115 horse power. The yearly production of these mills, reckoning 280 work days per year, is about 950,000 chetverts of rye, or 5,663,000 American bushels, equalling 8,500,000 pouds or 137,045.5 tons.

On assuming that the population of the Empire amounts to 110 millions, and that in European Russia its number exceeds 85 millions, and admitting further a

yearly consumption of one-fourth ton of rye and wheat per capita, it is easy to notice that the official data register only one-ninth of the flour consumed in the Empire, or one-eighth of that consumed in European Russia. Moreover, this flour is used in many manufactures, for instance in the distilleries; it also forms a somewhat considerable foreign export, as will be seen below, and an equal quantity is sent to Finland. All these facts lead to the conclusion that the local household production of flour by hand or by windmills, water or animal power, is still strongly developed in Russia, although such methods of manufacture, owing to special circumstances, are completely excluded from official registration.

The shipment of flour abroad is insignificant and, in comparison to the export of grain, of no great importance, as follows:

In 1889	flour of all kinds except potato flour.	. 49,795 tons.
» 1890	» » » » » » »	. 39,300 » *
» 1891	» » » » » » »	. 41,283 » **

The export of bran from Russia is comparatively greater, a fact which generally speaking is undesirable, and may be shown as follows:

Years.	Tons.	Years.	Tons.
1884 . . .	86,145	1888 . . .	211,236
1885 . . .	61,433	1889 . . .	179,352
1886 . . .	70,718	1890 . . .	171,372
1887 . . .	104,764	1891 . . .	126,380

As to the import of flour to Russia, it has not the least influence on the Russian production, due to the protection of high custom duties. In 1890 it reached 3,170 tons, and in 1891, about 2,120 tons, including a certain quantity of groats and malt. Owing to so small an import of meal supplies, their home production is still largely developing. Macaroni and vermicelli are also made with great success at some of the Russian mills, as well as in other establishments; the mealy breaks obtained at the *kroupchatka* mills are used in their manufacture.

From all that has been said about the present condition of the milling industry in Russia it may be concluded that it will attain a large development, leading to a cheaper and more convenient way of satisfying the local demands for flour, as well as to a larger shipment abroad, supplanting to some extent at least the export of grain thereto.

The manufacture of groats for cooking purposes, and especially for various gruels, forming one of the principal foodstuffs of the bulk of the Russian population, is

* Including 26,280 tons of wheat flour to the value of 3,153,600 roubles; and 12,230 tons of rye flour, to the value of 673,000 roubles.

** Including 29,295 tons of wheat flour to the value of 3,515,400 roubles, and 11,463 tons of rye flour, to the value of 630,400 roubles.

of course closely associated with the flour-grinding business. For this purpose the grain is either simply broken, receiving an angular form, as for buckwheat; or it is cut into a regular shape, as practised for pearl groats made of barley, or groats from other grain, including buckwheat, which, when receiving a round shape, is known in Russia by the name of *Smolensk* groats.

The sets for producing groats mostly consist of one stone turning on a vertical or horizontal axis, and working not with its flat, but with its cylindrical surface. The grain settles in the circular space, between the stone and the casing which, in sets with horizontal axes, also has a rotatory motion, but in a direction opposite to that of the stone. The feed is given successively; when the desired shape is obtained the ready groats are let out, and a new feed poured in. The feed of the grain and the delivery of the ready product are often done by automatic machinery, which works at will the number of the rotations of the upper millstone, depending on the quality of the grain and the sort of groats produced. The further work consists in separating the groats from the hulls and flour, and in grading them according to size by means of bolters and sieves. The finishing process is the polishing; it is done in sets of the same type, but instead of stones, smooth wooden rollers are used. The groats are fed into the sets together with the hulls, which are afterwards fanned by means of aspirators. Before the grinding of the groats the grain is carefully sorted and separated from the hull with the help of purifiers and hulling machines. For the preparation of fine groats or grits, the grain is cut into pieces by cone-fluted rollers and other similar machines. In most cases instead of this, the rounding of the grain is continued for some time; in this way the quantity of flour-dust is certainly much larger, at the expense of the production.

The general organization of mills for grinding groats, as a special article of trade, is most simple. Such mills either exist as independent establishments, or form a part of large flour mills or other works using their motors. The manufacture of groats, as an independent branch of industry, is but little developed in Russia; in the villages, groats as well as flour are often prepared at home in the most elementary way, which excludes every possibility of official registration.

According to the official data for 1890, there were 304 groats mills working independently, besides 281 established at flour mills and other manufactories and moved by their motors. The total production of all these mills amounts to about 100,000 tons, to the value of 6,899,000 paper roubles, or 3,539,000 dollars. A certain portion of these goods, of a better make than the local and home-made products, are exported; a very small quantity goes to Finland. The shipment of groats abroad was of late years as follows:

Years.	Tons.
1889	21,347
1890	25,039
1891	16,961

Concerning the import of grain it must be remarked that except rice, not grown in Russia and mostly brought from Persia in the form of groats, all such goods are imported in very small quantities; this may be seen from the official data referring to the import of flour, in which groats are included.

It has been already mentioned that the manufacture of groats has no great development in Russia. Indeed, if the yearly consumption per capita be reckoned at about 50 pounds, the total for European Russia alone will reach over 2,000,000 tons; but in a country where gruel is such a common meal, the demand for groats must be much greater. On considering these facts, as well as those reported in the official data already mentioned, it is obvious what an enormous development awaits this branch of manufacture in Russia.

THE MANUFACTURE OF LUBRICATING OILS*.

The production of tallow and other animal fats must be classed among the important branches of Russian industry; but in comparison with former years the trying of tallow and of lard has considerably decreased. According to official data for 1880 to 1884 there were in European Russia, including Poland, 453 tallow manufactories with a yearly output to the value of 8,618,000 roubles; in 1885 to 1889 the number of such factories fell to 300, their yearly production amounting to 5,508,000 roubles. Such a decline in the industry is explained by the decrease in the demand for tallow in the interior, as well as on the foreign markets, resulting from the rising consumption of mineral oils, both lighting and machine oils. It is well known that the production of naphtha has increased in Russia five times from 1882 to 1892; the manufacture of machine oil has also greatly developed during the same period. Besides, the number of cattle in the eastern governments of Russia have also much decreased in the same decade, owing to the development of agriculture and the increase in the population, thus unfavourably influencing the yield of tallow.

The principal region of the tallow industry is at present the western part of Siberia, government of Tobolsk, the steppes of Central Asia (the district of Akmo-linsk); and in European Russia the Don Kossacks district, where the tallow business is still flourishing, owing to the considerable numbers of cattle in the steppe districts of these localities. Of the governments which are far from these provinces, and where cattle are mostly bred for slaughter, the tallow industry as a registered branch of manufacture is important only in the government of St. Petersburg, its output of tallow amounting to 700,000 roubles. Here the industry is kept up by the existence of large slaughter houses, whither great herds of cattle are brought from remote localities, and by the extensive development of the manufactures of soap, candles, and cosmetics. All the 642 tallow manufactories in the Empire yield 1,100,000 pounds of beef and mutton tallow, to the value of 3,750,000 roubles.

Of no little importance is the extraction of oils from the larger kinds of marine animals, of which the whale, the *belouga*, white grampus (*delphinapterus leucas*), the walrus, and the seal (*phoca*) are found in the Arctic Ocean; dolphins and seals also live in the Black Sea, and the latter are found in the Baltic and Caspian waters

* Part of the data concerning not only the growing of oil plants but also the manufacture of vegetable and animal oils are included in Agriculture and Forestry, Volume III, of this work, where the reader will also find information about many other foodstuffs, such as milk and its products, wine, fish, and other industries.

as well. Of these animals only the whale, the walrus, and the seal are taken; the catching of whales is scarcely begun, and that on the coasts of the Pacific, where small whales are still to be found. In the north the principal oil is obtained from the white grampus, *belouga*; if the hunt be successful, from 20,000 to 80,000 pouds of oil are extracted from the catch. On the Caspian Sea oil is mostly obtained from seals, its quantity amounting to 100,000 pouds.

Besides the sea mammalia, oil is produced from many kinds of fish. The most important point of such production, owing to the abundance of material, is the coast of the Caspian. Oil is mostly obtained from the so-called *chistikovi* fish. In former years it was principally produced from Astrakhan herring (*clupea caspia*), but since these have been salted and sold for food other fish have been taken for the oil. At present the greatest quantity of fish oil is furnished by Volga lampreys (*petromyzon Wagneri*). The total amount of fish oil obtained at the Caspian fisheries is from 50,000 to 70,000 pouds yearly; it is also produced on the shores of the Arctic ocean, but on a small scale.

Fat is employed in the manufacture of oleomargarine, candles, stearine, oil and other products. The margarine factories are not numerous, but their production is larger than that of the registered tallow works. According to recent data there were 6 such factories, with a production amounting to 1,500,000 roubles. Half of these works, and 58.3 per cent of the production, fall to the government of Moscow alone; the rest of the factories are divided between the governments of St. Petersburg, Kherson (Odessa), and Warsaw. As the widely spread sale of oleomargarine instead of butter, a more costly article, has been more than once noted, measures have been taken by the police and sanitary authorities to check the industry, followed by a great decrease in the amount of manufacture.

The making of tallow and stearine candles and soap, is closely connected with the tallow industry. The production of tallow candles obviously tends to decline. In 1880 to 1884 there were in European Russia, Poland included, 479 tallow candle manufactories, with an output of 2,297,000 roubles; in 1884 to 1889 their number decreased to 145, and the value of the production to 549,000 roubles. This considerable decrease in the output is the result of the vast spreading of kerosene among the bulk of the population, because of the fact that it is cheaper, and gives a much better light, than tallow candles. The tallow candle works in Russia are generally small; the largest of them, in Moscow, produce candles for less than 100,000 roubles; the yearly production of most of the others ranges from 1,000 to 5,000 roubles.

The stearine production is more active, although the development of the naphtha industry has also had an unfavourable influence thereon. In the period from 1880 to 1884, 15 Russian stearine factories produced goods to the value of 11,614,000 roubles; five years later (1884 to 1889) their number decreased to 13, with a production of 8,861,000 roubles. The making of candles has long ago ceased to be the sole speciality of the Russian stearine works. Although they still produce candles on a large scale, other products have been added to the list, such as glycerine, olein and olein acid. The total quantity of different goods produced by the stearine factories amounts at present to 1,426,100 pouds, of which 73 per cent fall to stearine candles, 0.07 per cent to palm candles, 7.1 per cent to glycerine and 16.9 per cent to olein. This manufacture is chiefly centred in the governments of St. Petersburg,

Kazan, Moscow, and Warsaw. The stearine factories use not only tallow, which gives as a by-product candles of second quality and rarely required, but also palm oil which changes the quality of the stearine.

Of all the branches of the industry dealing with fats and oils as materials of production, the manufacture of soap is in the most favourable position; as the demand for soap is constantly increasing among the Russian population, and is almost entirely satisfied by the home production, the import of foreign soap is very limited. In Russia 466 manufactories are engaged in the making of different kinds of soap; their production amounts to 2,636,500 pouds, to the value of 8,388,000 roubles. As the prices for tallow have fallen in recent years, the soap manufactories, situated in some of the Russian ports, began to use in their works, besides Russian grease, foreign fats, and to a certain extent cocoanut oil, produced in Russia from the pulp of palm nuts, and copra brought from the tropics. As cocoanut oil is very saponific, it easily communicates this quality to the other fatty materials added to it; the excess of water contained in it favours the admixture with different soluble salts, and other substances of which the Russian manufactories, following the example of the foreign works, try to avail themselves, much to the expense of the product.

The manufacture of soap is spread almost over all Russia, but it is principally centred in the governments of Moscow, St. Petersburg, Kazan, Kherson, and Warsaw. In St. Petersburg, Moscow, and Warsaw some firms produce soap of high quality, the prices of which are much lower than those of foreign makes.

The production of tallow and stearine candles, as already mentioned, gradually decreases. Just the reverse may be said with regard to wax candles, as their manufacture increases constantly. In 1880 to 1884 there were in Russia, the Asiatic provinces excluded (Siberia and central Asia), 214 manufactories with a production valued at 4,444,000 roubles; in 1885 to 1889 their number increased to 248, the value of the output being 5,108,000 roubles. In Russia wax candles are exclusively employed for church use, namely, for lighting and for burning before the sacred images (ikons); in their manufacture not only beeswax is used, but also purified mineral wax (ozocerite, ceresin). Ozocerite was brought from Galicia in the beginning of the sixties, and was soon universally employed as a very important material in the manufacture of imitation wax. Not differing much from beeswax, and more easily admixed with it than other surrogates, it is at the same time infinitely cheaper than the latter. In 1881, in order to further the home production of ozocerite, layers of which were discovered in the islands of the Caspian Sea (Holy Island and Cheleken), and to maintain the Russian agriculture and beeswax bleaching works, foreign ozocerite and ceresin were taxed with a high customs duty. In consequence the import of ceresin decreased, but the ozocerite was brought in greater quantities, as special factories were established in the region of the Vistula, government of Petrokov, for the working of ceresin from the Austrian ozocerite. At present there are 5 ceresin works, their production amounting to over 140,000 pouds, to the value of 1,293,000 roubles. As only 16 factories are making candles from pure ceresin as a speciality, to the value of 100,000 roubles, the greatest part of the remaining material is probably used as an admixture of beeswax.

In order to ensure the making of tapers from pure wax, the output of the diocesan wax candle manufactories in Russia has been increased. As the demands for

wax candles are very large, the factories producing them are found almost every where, but the larger ones are centred in the government of Moscow. The number of wax candle works amounts now to 260, their production being 230,000 pouds, to the value of 5,340,000 roubles. For the making of paraffin candles there are 2 manufactories, with a yearly output of 210,000 roubles. They are both situated in the Vistula region.

The following data concerning the average export for the periods of 1881 to 1885, and 1886 to 1890, give an idea of the insignificance of the turnover of the Russian trade in substances obtained from animal fats, as well as in ozocerite and ceresin.

	EXPORT IN POUNDS.	
	1881 to 1885.	1886 to 1890.
Tallow	262,594	233,831
Soap	26,135	44,606
Stearine	749	35
Paraffin	140,989	16,329
Wax	2,393	1,374
Tallow candles	2,345	5,506
Wax »	283	850
Stearine »	26,762	48,449

	IMPORT IN POUNDS.	
	1881 to 1885.	1886 to 1890.
Tallow	299,162	158,845
Whale and cod-liver oil unpurified	37,658	39,912
Soap	14,826	10,581
Stearine	47,506	9,421
Paraffin	37,596	54,287
Beeswax	8,570	30,348
Ozocerite	*	266,060
Ceresin	74,178	17,661
Candles	13,895	6,989

*) Ozocerite has been mentioned separately only since 1885.

Besides this, a certain quantity of fats and vegetable oils, as well as purified cod-liver oil, has been imported. If a certain decline in the production of animal fats and oils is observed, that of the vegetable oils on the contrary is visibly on the increase. In the period of 1880 to 1884 such oils were produced in European Russia, Finland excluded, to the value of 11,303,000 roubles and in the years 1885 to 1889, to 14,000,000 roubles.

It should be mentioned that these figures show only the dimensions of the output of the factories, independent of which a great number of small oil mills owned by peasants are scattered over all Russia *. The products of this branch of industry are various, owing to the fact that the culture of different oleaginous plants is widely spread in Russia. Oil is obtained from linseed (*linum usitatissimum*), hempseed (*cannabis sativa*), sunflower (*heliantus annuus*), mustard seed (*sinapis*), rape or colza seed (*brassica campestris oleifera*), turnip, cabbage seed (*brassica napus oleifera*), poppy seed (*papaver somniferum*), castor-oil plant seed (*ricinus communis*), sesame seed (*sesamum orientale*), China turnip seed (*raphanus sativas*), lallemantia cress, *camelina sativa*, and others.

Besides this, oil is made from foreign imported materials, for instance, cocoa and palm oil. The production of special kinds of oil at separate mills depends to a considerable degree on their geographical position, on the area of the culture of oleaginous plants; generally such oil is produced from the plants grown in the locality. An exception is made in the case of large manufacturing centres, such as St. Petersburg, Moscow, Riga, Odessa, to which material is brought from all the provinces. As the culture of flax and hemp has been one of the most widely spread from time immemorial in Russia, factories for producing oil from their seeds are the most numerous. According to the crops, the yield of linseed in European Russia amounts from 11,000,000 to 22,000,000 pouds, and that of hempseed from 4,400,000 to 14,000,000 pouds. The official data give the number of oil mills producing hemp seed oil as 268, yielding about 712,000 pouds, to the value of 2,446,000 roubles; and that of mills producing linseed oil, as 119 with a production of about 540,000 pouds, to the sum of 2,830,000 roubles. As the hemp-growing area does not quite coincide with the limits of the culture of flax for seed, the mills for making hemp and linseed oil are not equally distributed in different governments. The principal localities where hempseed oil is produced are: the governments of Chernigov, Orel, Smolensk, Kaluga, and Kursk; linseed oil is mainly produced in the governments of St. Petersburg, Kherson, and in Lithuania, and to some extent in the governments of Orel and Vladimir. It may be stated that the manufacture of hempseed oil keeps within the limits of the area where the plant is grown, not so the production of linseed oil.

The making of oil from the seeds of the sunflower is also vastly spread in Russia, notwithstanding that its establishment in comparison with that of hempseed and linseed oil is quite recent, dating only from the forties. Until then the sunflower was cultivated only as a garden flower, for the adornment of yards, as well

*) An example of the number of such mills is represented by the government of Kursk, in which there are 1,414 small oil mills, while only 40 large factories, with a production of 1000 roubles and more.

as kitchen gardens. The first to introduce a larger cultivation of the sunflower were the inhabitants of the government of Saratov; the peasants liked so much the taste of the kernel, which somewhat resembles that of the cedar nut, that it soon came into great demand. The development of the culture of the sunflower, and of the manufacture of oil from its seeds, is in a great part due to an accidental circumstance. A peasant of the village Alexeievka, government of Voronezh, Bocarev by name, came to Saratov; on noticing how much the kernel of the sunflower resembled the cedar nut, from which an excellent table oil was extracted, he hit upon the idea of using the seeds for making oil. He bought some in Saratov, and on his return to Alexeievka sowed them there. The crop was very good, and he tried the experiment of producing oil, and obtained some of the best quality. The first success encouraged him to enlarge his field, and soon he was able to sell some of the new product. The other peasants of Alexeievka followed his example in growing the sunflower, the cultivation of which spread over the districts of Ostrogozhsk and Valouysk; the inhabitants of the town of Saratov also began to take an active part in the industry. The demand for the new product suddenly increased to a remarkable degree, and it soon found ready markets in Moscow, St. Petersburg, and other large towns, and even abroad.

The majority of the now existing oil mills were founded in the eighties, due to the increase of the sunflower fields, influenced by the ready sale of the oil; in the period from 1880 to 1886 the quantity of land under sunflower increased by 98 per cent. However, not the whole crop of sunflower seed is brought to the mills to be worked into oil; a considerable portion of it is eaten as a nut, the seeds being therefore classified into crack kernels (*grysovyie*) and oil kernels (*maslichnyie*). The number of oil mills working sunflower seed amounts to 109, but they are larger than those producing hemp seed oil; their output reaches over 600,000 pouds, to the value of 2,185,000 roubles. Nevertheless this manufacture does not comprise a very large region, it exists only in 9 or 10 governments; 82.3 per cent fall to the government of Saratov, and 13.2 per cent, to that of Voronezh. Owing to the limited area of the cultivation of the sunflower, its crop has a great influence upon the number of oil mills, especially of the smaller ones. In years of bad crop they lessen their activity, or stop work altogether. However, even if the crop be good, such mills work only during 5 to 7 months, from September to April. The sunflower oil has no unpleasant taste, and no odour, is remarkably clear, and has little colour; it belongs to the number of easily dried oils, and therefore it is not only used for the table, but also for the preparation of oil colours.

Mustard oil is made almost exclusively in the southern part of the government of Saratov. This manufacture was induced by the initiative of the Imperial Free Economic Society which, in 1799, sent to the colonists settled in Sarepta some mustard seed; but the making of oil therefrom remained for a long time almost a monopoly in the family of the colonist Glich. This firm was the only one producing mustard oil, its articles being of a high quality, but rather dear, owing to the lack of competition. The manufacture developed greatly and the goods grew cheaper since other makers began to rival Glich, and especially since 1884 when the firm V. Voronine and Son established at Doubovka a large and perfectly organized oil mill, which greatly influenced the growth of the demand for mustard seed, and prices advanced accordingly.

On the other hand, the article produced grew cheaper owing to competition, and enjoyed a larger sale. At the present time the production of mustard oil amounts from 50,000 to 55,000 pouds, valued at 320,000 to 350,000 roubles. The region of its sale gradually increases, due to its high quality, and the demand for it always outgrows the supply. The making of mustard oil is closely connected with the growing of mustard, which reaches yearly 100,000 to 110,000 pouds.

The manufacture of rape and turnip-cabbage seed oils, in which 57 oil mills with a production of 900,000 roubles are engaged, is chiefly centred in the Vistula region, in the Baltic and southern governments (Odessa). The production of castor-oil from ricinus exists principally in Moscow, and in the Vistula region; 5 mills are engaged in the manufacture, with a yearly output of 115,000 pouds, to the value of 730,000 roubles. It is principally used for the preparation of the so-called alizarine oil, employed in the dyeing of calico Adrianopol red. Sesame oil is mostly made in the south of Russia, in the governments of Kherson (Odessa) and Tiflis, and in the Transcaspiian region.

Besides the oils obtained from oleaginous plants cultivated in Russia, some cocoa and palm oils are produced from the foreign raw material. Although only 5 mills are engaged in this industry, their average yield is about 240,000 pouds, to the value of 1,200,000 roubles. As the material for the making of cocoa oil (pulp of cocoanuts, or copra) is brought from tropical countries, the cocoa oil mills are situated in the nearest vicinity to the frontier, namely, St. Petersburg, Libau, Riga, Odessa. The quantity of palm oil produced in Russia is quite insignificant, as compared to that of cocoa oil; it amounts only to 4,000 pouds, to the value of 23,000 roubles.

To complete this review it should be mentioned that the official data cover, besides the number of factories working vegetable oils, 60 factories engaged in the production of various kinds of oil, their output reaching 2,140,000 roubles, 77 per cent of which falls to the Baltic region.

Some of these oils, namely, rape and cocoa oil, together with olive, castor, and vaseline oil, are used in the manufacture of artificial lamp oil, the so-called *garnoie*, a substitute for olive oil; some of the factories of Moscow, St. Petersburg and of other towns, are engaged in this manufacture. The cocoa oil is added to give the mixture a greater consistency, to increase its specific gravity, and to render it capable of freezing. The principal compound part of the oil called *garnoie* is vaseline, more often called *perfumer's* naphtha oil. It is a light, lubricating oil with no colour, obtained by a very good purifying of the product of naphtha, holding the mean between the solar and the lubricating oils. Besides the above mentioned materials, some of the factories prepare artificial olive oil from cod-liver oil, sunflower oil, et cetera. In order to give the product a greenish colour chlorophyll (bought in extracts or prepared at the factories from nettles) and artificial aniline pigments are used. The analyses of the artificial olive oil have shown that it contains only from 10 to 35 per cent of pure olive oil, while the principal ingredient, vaseline, sometimes reaches 75 per cent.

The foreign trade in vegetable oils, during the decade 1880 to 1890, was as follows.

	AVERAGE EXPORT IN POUDS.	
	1881—1885.	1886—1890.
Hemp seed oil	} 8,832	10,866
Linseed oil		19,293
Sunflower oil	14,331	1,201
Other vegetable oils	27,736	37,229

	AVERAGE IMPORT IN POUDS.	
	1881—1885.	1886—1890.
Cocoa and palm oil	229,251	239,870
Olive oil	1,276,725	715,160



CHAPTER XXI.

Ship building and Navigation.

THE extent of the Russian Empire, without counting the considerable inland water surface, is equal to 8,343,155 English square miles. The northern part is washed by the Arctic Ocean, the eastern by the Pacific; to the south stretch the Caspian and Black seas; and to the west, the Baltic. The oceans break into the continent, forming extensive gulfs, known as separate seas, such as the White, the Behring, and the Okhotsk. The total length of the coast line is 19,325 miles, and of this 12,600 miles in straight lines fall to the share of the oceans and seas. As, however, the winding nature of the shores increases the length of the coast line to more than double this number, its total length may be taken as about 26,516 miles.

The inland seas and lakes have a total area of more than 351,000 square miles. The Caspian Sea covers 185,000 square miles; the Sea of Aral, 26,364; the Sea of Azov, 14,300; Lake Baikal, 13,000; Lake Ladoga, 7,000; Lake Onega, 3,540; Issykul 2,640 miles; while as many as thirty lakes have an area varying from 440 to 2,200 square miles. All these lakes have rivers flowing into them, and form systems of water ways.

The rivers of the Empire are among the largest in the world. The river Obi flows through 3,250 miles; the Lena, 2,850; the Amour, 2,790; the Volga, 2,220; the Upper Tunguzka, 1,820; the Lower Tunguzka, 1,665; the Ural, 1,500; the Dnieper, 1,340; whilst twenty-seven other streams have a length varying from 663 to 1,300 miles. Besides this, there are as many as a hundred rivers in European Russia, which form part of the regular systems of navigation, vessels being able to ply both up and down their courses. There are also many rivers which only allow of vessels being floated down; and a whole network of streams and rivulets are used for floating lumber and logs in springtime. The total length of all the rivers in European Russia for navigation and rafting exceeds 66,290 miles; this includes a length of 13,300 miles suitable for steamers.

The extent of the Russian Empire from north to south is 42° or 2,900 miles, and from east to west, 167° 41' 29" or 6,670 miles; therefore cheap water communication is a question of the highest importance to the economical development of the country. From the time of Peter the Great the Government has been occupied in connecting the basins of rivers falling into the various seas, and from 1703 until 1850 the work of connecting the seas has been continuously carried on. At the present time the Caspian and White seas are connected with each other, and also with the Baltic, the latter being also joined to the Black Sea. These artificial connections, by means of canals between the basins of rivers, have furnished uninterrupted inland navigation from Astrakhan to Archangel, a distance of 2,810 miles; from Kherson to Tilsit, 1,532 miles; and from Kherson to Riga, 1,525 miles. The rivers and their tributaries make up 19,900 miles; so that only 398 miles, or about 2 per cent, fall to the share of the canals. At present the work of connecting the Obi and Yenesei in Siberia is being carried on there; by digging a canal 4.64 miles long, and clearing the tributary streams for a length of 133 miles, a network of water-roads 13,258 miles long will be formed, which will give an exchange of produce over 1,989 miles longitude, and 3,971 miles latitude. All these water roads, passing through different climates and greatly varying degrees of culture of the inhabitants, comprise so many means of transport that only a very long list would enumerate them. Beginning with the small streams and rivulets, where the timber is floated down in loose logs or chains of logs linked together in single file, or by forming a girdle surrounding loose logs, or else in simple rafts. Afterwards, passing into the rivers, the wood is lashed into rafts of several layers, and the logs and other forms of timber are loaded on barges, lighters, and other vessels constructed only for one voyage. The more costly kinds of merchandise have called forth progressive improvement in the type of vessels, varying from the simplest kind to the steel steamers of the most modern construction.

In Eastern Siberia, where the most primitive mode of life still prevails, locomotion is effected by means of rafts, boats, or canoes made of birch bark, skins of beasts, or bladders. On the Amour, the Yenesei, and other large streams of Siberia, ply also very luxuriously fitted steamers. On the rivers of European Russia, steamers of the American type, similar to floating palaces, are now much used. In short, the existing variety of craft on these waters furnishes data for the history of culture, embracing that of the art of ship building. Those remote corners, where civilization has not yet penetrated, show how navigation was practised a thousand years ago. In those places where agriculture, mining, and manufacturing industries are developing, the art of ship building has rapidly improved. In central and western Russia, where machine construction, manufacturing, and the European mode of life have taken root, the ship building is not in any degree inferior to that of Western Europe. There are as many as thirty types of steamers and sailing vessels for coasting and cruising in the merchant navy, and the fleet comprises vessels of twenty various denominations. These numerous types of large registered ships differ in design, materials, construction, means of propulsion, armament, commercial and warlike character. Each type has been the result of experience, and has its own history. It cannot be said that the mariners hold to their own models from conservative feelings; on the contrary, advantageous novelties are eagerly taken up, in order to compete for supremacy on the rivers and seas.

The introduction of the steam engine has naturally effected a thorough revolution in navigation, as well as in all other branches of trade. The vessels towed by the steamers have also changed their construction, as well as the steamers themselves. The substitution of steam for sails, of steamers instead of towing straps and horses, have necessitated new tackle, new proportions of length and breadth in the vessels, and in general created a new era in ship building and naval architecture. The teams of horses have only quite lately passed away; formerly, about thirty horses were harnessed to a capstan and windlass apparatus, which was pulled to an anchor fixed higher up stream; they used to tow a line of barges, carrying over 1,000 tons freight, at the rate of a mile and a quarter per hour. Winches were then introduced, and forty-horse power steam engines took the place of horses, and a speed of one and a half miles per hour against the stream was attained. These again did not last long but soon gave way to steam tugs and steamers, which now take the lead in transporting goods and passengers on inland waters. Until the introduction of steam-traction, the law provided that there should be three workmen on the vessels for every fifteen tons of merchandise. The vessels, which were decked barks, carried a very heavy mast and clumsy sail, which only allowed them to sail under full wind. When the wind was from the side, the vessels used to lie at anchor; in fair weather the towing-tackle was used, where the nature of the bank permitted, or the anchor was carried forward in a row boat and dropped, when it was used to pull up to, the rope being hauled in on the deck. The loss of time by this method and great expense of the journey, in consequence of hiring such large gangs of workmen, enabled the first steam tugs to pay 20 to 30 per cent per annum on their capital. The steamers were in such demand that they could choose those boats which offered the least resistance to the water; this selection brought forth a new type of vessels, called barges, which are now almost exclusively used on all the large rivers.

The introduction of steam power, besides affecting ship building, also made considerable changes in the social and economical condition of the population. Until steam tugs were used, the hauling trade was very much spread throughout the inland water roads; those who were free from agricultural labour hired themselves out, and in spring time the number of haulers on the rivers of European Russia amounted to about 600,000 men. Steam power has now taken the place of the haulers, and the democratic decked barks have lived their day, giving place to the barges and other types of boats towed by steam tugs. The barge is the favourite type on the Volga and its tributaries; 2,508 of them were entered in the list of non-steam vessels in 1890, according to the statistics of the Ministry of Ways of Communication. They are built of wood, and rarely of iron. They are flat-bottomed, like all river boats; instead of timber frames, the fir trees are dug out with the roots and fashioned into ribs, which are fixed on the bottoms. The sheathing and deck are made of pine-planking which is carefully caulked and coated with vegetable or naphtha tar. The hold is one storehouse without partitions, and the merchandise is loaded on the floor in sacks, bags or in bulk. The barges are used for conveying grain, salt, wood, cotton, fish, lime, timber, crockery, fruit, watermelons, and other goods. Since the widely-spreading consumption of naphtha, kerosene, naphtha refuse, and mineral lubricating oils, a whole fleet of barges is engaged in transporting these products, which are either loaded in bulk, or in barrels.

The life of a wooden barge is generally estimated at eight to fifteen seasons, but there are many in existence which have served more than twenty years. Iron and steel barges are generally amortized in twenty to thirty years. The barges on the Volga are from 65 to 335 feet long, 25 to 45 feet wide with a displacement of water from 2 to 9 feet. These barges carry from 100 to 3,000 tons. It is evident that such a heavy weight, even when moving with the slow speed of three or four miles an hour, acquires a very considerable momentum, so that any stranding will have a very deleterious effect upon them. Besides this, the barges are moored together in a caravan behind the steam tug, so any false movement affects the whole line, and this also considerably shortens the serviceable life of the barge.

The barges on the Volga are for the most part from 200 to 300 feet long, and, when fully loaded, carry from 1,000 to 1,350 tons. The cost of such barges, built of wood and fully rigged, is from 3,000 to 4,000 dollars. It is only under the most favourable circumstances that these barges are able to make in one season three journeys of 1,000 miles when loaded with merchandise. They are only fully freighted, to a displacement of seven or eight feet, during the first spring journey. The other journeys are effected with only one-third of the full load, or a displacement of three or three and a half feet. The freight for one to two hundred miles is about thirty cents per ton, and depends principally upon the harvest. In good years the charges of the steam tug are higher, but the ship owners also fare very well. The barges are built in proportion to the expectations of the crops, which can be judged at a very early stage. Thus, it may be seen that they were built in very large quantities in 1886, 1887, and 1888, when wheat was very abundant, and in much demand abroad.

On the Volga basin there are in all 2,508 barges, which, according to their length, capacity, and cost, may be classed as follows:

1.	40	barges	under	70	feet	long
2.	529	»	»	140	»	»
3.	444	»	»	210	»	»
4.	523	»	»	280	»	»
5.	969	»	»	350	»	»
6.	3	»	»	400	»	»

The first carry 30 to 80 tons freight, the second 400 tons, the third as high as 800 tons, the fourth 1,200 tons, the fifth up to 1,800 tons; and finally, there are the three barges of Nobel Brothers, which carry 1,700 tons of kerosene each. This fleet of barges when fully loaded can carry 2,500,000 tons. The cost of construction of a wooden barge may be estimated at about three dollars per ton displacement. Iron barges cost twenty dollars per ton. The number of iron barges is not mentioned in the lists, and therefore, if all the barges be counted as wooden, it will not be far wrong to state that the total cost of the barges on the Volga is about four million dollars.

In distributing the barges as to ownership, it will be seen that the small

boats are owned by small ship owners, who generally possess one, two, but rarely as many as five. As regards the larger barges, they are mostly the property of important merchants, joint-stock and steamboat companies. For instance, the grain-dealers Bashkirov and Blinov have 32 barges each; Bulychev owns 34; Zhuravlev, 42; the successors of Kurbatov, 56; Nobel Brothers, 74; the steamboat companies, Drouzhina, 56; Lebed, 50; the Caucasus and Mercury Company, 50.

Besides the barges on the Volga basin, there are also 150 *aslankas*, 511 barks, 97 *gusiankas*, 70 ferry boats, 168 large barks, some special barks for the river Moksha, *amazonkas*, and long boats, in all, 4,824 vessels, according to official statistics. It may be mentioned that this list does not include those vessels which are only constructed for one cruise down the stream during the spring high waters. These are broken up at the end of their journey, and used for fuel and building purposes. The principal boats of this class are *belianas*, which are built in the wooded country up the river, loaded with wooden goods, sledge runners, felloes, spokes, naves of wheels, shafts, barrel staves, and the like, which fetch a high price in the poorly wooded districts of southern Russia. In some places these vessels are 350 feet long, 50 feet wide, and have a draught of as much as 14 feet; they carry 5,000 tons freight.

Amongst the peculiar kinds of navigation adapted to rapid winding rivers, that of the so-called plummet may be mentioned. This is an oval-shaped piece, either cast-iron, weighing about 1.61 tons, or a stone of the same weight, lowered by means of two hempen ropes from the prow of the vessel. The ends of the ropes are attached to the sides with pins, the vessel being steered with the helm and rudder. In straight reaches this weight is tightened up to the vessel in order to diminish its friction against the bottom of the stream; but where the river bends, if the ship does not answer the helm, it is steered by means of the ropes holding this weight, one end being slackened, and the other taut on the side to which the boat is to be directed. This method has only been in use about thirty years on the Volga basin, and the pilots are so skilful in applying it, that a weight of one ton enables them to dispense with ten men.

The whole of the Volga fleet, exclusive of steamers, is composed of 4,824 vessels, which last from three to fifteen years, giving an average of nine seasons. Therefore, the ninth part of this number, or 530 vessels, must be built every year in order to fill up the annual loss.

On the basin of the Northern Dwina ply 531 vessels; of these, 142 are barges, 76 *karbases*, 232 *kayuks*, and 81 *pauzoks*. These barges vary from 85 to 210 feet in length, one barge only being 280 feet long and 32 feet wide, having a draught of six feet, and capable of carrying 1,000 tons; the majority only load from 300 to 500 tons. They are either floated down the current, or else towed by steamers; and they carry grain, flax, lumber, and various other merchandise to Archangel for foreign ports, or else for local towns and settlements. This region is scantily populated, and therefore return freights are rare for such large vessels up the Dwina, the exchange of produce being carried on with the *karbas* which are not more than fifty feet long, and when fully loaded only draw three feet of water, carrying ten to fifteen tons. They are manned by three men, go well under canvas, and enliven all the tributaries of the Northern Dwina.

That peculiar build of boat, called *kayuk*, is characteristic of this basin. They

ply upon the Kubensk lake, and along the Duke of Wirtemberg canal, which connects the White Sea basin with those of the Baltic and Caspian seas. As locks are frequent on these junctions, these boats have been constructed to accommodate themselves to the length and breadth of the chambers of the locks. These *kayuks* are from 110 to 126 feet long, 21 to 28 feet wide, and draw $4\frac{1}{2}$ feet of water with a cargo of 210 tons. They are either decked or half-decked, sometimes with planked roofs, and sometimes only having a penthouse. They are either towed by steamers, or else with ropes, according to circumstances; they do not last more than five seasons. They are cheaper to build than the Volga boats of similar dimensions, principally because wood is cheap, iron dear and little used for fastenings.

Upon the Neva basin, taken together with the Mariinsk, Tikhvin and Vyshni-volotsk systems, which connect the Caspian Sea with the Baltic, there are 6,128 vessels. Here the predominating types are *polulodki* and *mariinki*; of the former there are 2,212, and of the latter 1,825. They ply upon the Mariinsk system between St. Petersburg and Rybinsk. They are from 126 to 140 feet long, 23 to 28 feet wide, and when fully loaded, draw from 5 to 7 feet of water; they carry from 300 to 500 tons freight. They only vary in the shape of the stern and of the prow. The *polulodki* have sharper curves, are built of better wood, have better-fitting frames and sheathing, and more solid iron fastenings. For this reason the *mariinki* only last from three to six seasons, and the *polulodki*, six to ten.

As the Neva and the Gulf of Finland form an outlet abroad for the whole of the Volga basin, which embraces twenty-four governments, as well as the Caucasus and the region beyond the Caspian, it is evident that the importance of the Mariinsk system increases rapidly in proportion to the development of Russia. In order to augment its capabilities of transport, it is being thoroughly reconstructed. The sum of 6,000,000 dollars has been voted to enlarge the locks, to enable them to accommodate the majority of the barges plying on the Volga. These improvements were designed at a time when most of the Volga boats were 210 feet long, and during the last five years an enormous number has been built upwards of 280 feet long. The idea was to enable the barges of the Kama, the Oka, and the Volga, to reach the seaport of St. Petersburg without unloading, to stand up alongside of the foreign vessels and unload directly into them. The project is therefore somewhat out of date, and probably the question of increasing the capacity of the Mariinsk system will soon come up again. This may be judged from the fact that, during the last ten years, the quantity of goods conveyed along the Neva and its lakes has varied between 2,170,000 and 3,330,000 tons, and as yet neither Siberia, across which a railway is now being laid, nor Central Asia, where industry is just commencing, hardly contributes anything towards these figures. The Mariinsk system, as well as the extensive basin of the Neva with its adjacent lakes, are a means of enlarging, developing, and enriching the Russian capital; wheat, fodder, building materials, fuel, and many other articles of consumption for the population of St. Petersburg and for export, are principally conveyed by water.

The list of vessels of the Neva basin, registered by the Ministry of Ways of Communication, to the number of 6,128, does not include those boats which are built in the upper parts of the river for one trip only. These are used for conveying wood and lumber, and are then taken to pieces, and used for fuel, fences, sidewalks,

and other purposes. According to the statistics of the River Police about one thousand of these come to St. Petersburg every year. In addition to this, more than 500 lighters are employed in reloading export and import cargoes between St. Petersburg and Cronstadt.

On these waters a special type of canal boat is used, plying on the Tikhvin system, which joins the Neva with the Volga through the Mologa. They are all of one size, namely, 65 feet long, 14 wide, and when fully loaded, draw $2\frac{1}{2}$ feet of water. There are 178 in all; they carry fifty tons, and enliven the forest-grown and otherwise impassable region of this part of Russia. The dimensions of the boats correspond to the size of the locks, and eighty years ago were deemed sufficient for the requirements of St. Petersburg, and of export. They are used for conveying wheat, wood, hay, eggs, potatoes, glass, cheap furniture, and other wares. They serve as a home for their owners during the summer, and do not cost more than 150 dollars. It is rare that two or three of them belong to the same individual; usually one man possesses only one boat, which he and his family live in, and navigate during the whole season. This state of democracy disappears as soon as the boats become more valuable. The *polulodkas*, for instance, are all in the hands of a few owners: Mr. Ananin owns 70; Mr. Borovkov, 80; Zherebkov Brothers, 85; Messrs. Konetsky, 105, whilst many have five, ten, or more. The same holds good with the *mariinkas*: Okhlobystin Brothers own 54; Mr. Lubimtsev 60, and the firm of Gromov and Co. possesses 265 of these craft.

The abundance of wood round about St. Petersburg, the cheapness of labour and high price of iron, prevent the vessels on the Neva basin from lasting very long. They rarely survive ten seasons, and in general only serve six or seven; hence, about a thousand are built every year, out of large-sized and expensive trees. In the westward regions, however, the boats last much longer. On the Narova and Louga rivers, and the Chud and Pskov lakes, the canoes, boats, *polulodki*, barks, and *pauzoks* serve fifteen and even twenty seasons. On the Western Dwina basin the Finnish barks are built to stand twenty seasons. The boats on the Niemen last twenty-five years, the *baidaks* thirty years, the *berlinas* fifty years, and the *batas* sixty years. On the Vistula, the Western Bug and Niemen, the *berlinas* last forty years; and the *habaras* forty-five and even as long as seventy years, being passed from one generation to another. Although the question of their longevity principally depends upon the quality of the oakwood, still careful handling and painting have a great influence on their durability.

On passing to the Dnieper, that historic Russian river that connects the Black Sea with the Baltic, it is evident that in this enormous basin the influence of the railways has put water communication into the shade. The Dnieper was at one time connected with the Western Dwina by means of the Beresinsk canal, forming a water way of 1,525 miles. This canal is now destroyed, as the lakes which supplied it are turning into marshes overgrown with weeds, and hardly give passage to rafts of timber in springtime.

According to the list of vessels on the Dnieper basin, exclusive of steamers, they are divided into two classes: there are 796 below the rapids, and 740 above. Of the former, the favourite type is the barge, of which there are 212 examples. These are towed by steam tugs to Nickolaiev and Odessa, and carry grain for

export; the other vessels are called, *trembaks*, brigs, *dubas*, and schooners. This is a remnant of the daring old school, where the true seaman of the sailing fleet was bred. All these vessels are from 22 to 110 feet long, 6 to 25 feet wide, draw from 4 to 10 feet of water, carry from 10 to 300 tons, and ply on the Dnieper, the Southern Bug, the Black and the Azov seas. All these types differ in build, manning, and rigging. They are strongly built, last as long as thirty years, and are used for carrying grain, salt, wood, vegetables, fruit, stone, lime, coal, and other merchandise. The owners of these boats complain of large steamers, barges, and cable boats, which are very hard for them to compete with; but as the trade continues to support them, this fleet continues to be renewed and repaired.

There have been many schemes for doing away with the rapids of the Dnieper which split up the river cruising, and prevent its being continuous. Blasting has been attempted canals have been opened around the rapids, and efforts have been made to ascend them by means of windlass apparatus. All these means do not present any particular technical difficulty, but it is entirely a question of cost. The rapids cover a distance of forty miles, the bed of the river is rocky, and the work would be very expensive, therefore no serious contractor, capable of carrying out the work successfully, has yet appeared.

There still remain the Don, Danube, Pruth, Dniester, and other rivers, having an aggregate number of 1,500 vessels. The total number of registered vessels in European Russia may be taken as 16,000. Siberia with its enormous river basins has been but little investigated, and its steamers and vessels are not yet counted. Those vessels, to the number of about 5,000 to 6,000, which are built for one journey, only down the rivers in spring time, are also not included.

According to the statistics of the Ministry of Ways of Communication the number of vessels, built annually in European Russia, is from 6,000 to 9,500, to the value of 2,000,000 to 3,225,000 dollars; this does not include the Caucasus, Finland, and Poland. The mean cost, taken during the last ten years, was 350 dollars per vessel. It may be remarked that the cost of construction increases considerably each year; thus, those vessels which in 1876 cost 250 dollars, were in 1886 quoted at 400 dollars; and at present cost 500 dollars. Moreover, statistics show that navigation and ship building tend to increase in proportion to the development of railways. Notwithstanding the increased cost of ship building, freights on inland waters continue to decrease every year. This is due to many causes, principally to the improvement of the water roads, the increased competition among the steam tug boats, improvement in the construction of these steamers, cheapness of fuel, and improved construction of the barges and sailing vessels.

Vessels, excepting steamers, are built on all river basins, principally where wood is cheap. For construction, a spot on a level, dry bank is chosen where the water will overflow in spring. Instead of a launch and blocks, frames are made of logs, and levelled to about four feet above the earth. A stage is built upon these, and the flat bottom of the vessel laid; frames are then set up, being fastened to the bottom with wooden pegs or iron pins, in the latter case the head of the pin being driven in from below, ribs are fitted to the frames, inside keels are placed at the prow and the stern, and staves put on. The pine wood for the sheathing is sawn damp, and chosen as long as possible. The stern and the prow are proportioned with

particular care, but everything is done by eye, without any drawings or special tools, the axe, chisel, plane, and saw constituting the whole stock in trade of the ship builder. When the sheathing reaches the height of the wash boards, cross beams are attached to the frames. The wood for them is chosen with a natural curvature; the beams are trimmed according to a pattern and, when quite levelled, the deck is laid upon them. When all the wood is sufficiently seasoned the caulking is commenced; this is done with hemp tow and rope ends.

The builder classes his carpenters according to their skill, and puts the best men on the most important parts of the ship. The caulkers are a special class, and pride themselves upon the conscientiousness of their work; and it may be said of them that they display much zeal in their slow, monotonous, and dull occupation. The carpenters often excuse their own imperfections with the phrase: «The caulkers will put it all right.»

After the caulking, the ship is plentifully smeared with hot tar, boiled to the consistency of sealing wax. Some boats, however, like the *belianka*, *unzhaki*, and large barks, which are only built for one cruise, are not tarred. As little iron as possible is used in their construction, wood being used instead wherever possible, thereby, much impairing their solidity and increasing the yearly number of wrecks. About 250 or 300 of them are wrecked annually, by colliding with each other, or through knocking against the lock gates, banks or rafts, or else from injury done by the waves of the rivers, as slight shocks are sometimes sufficient to sink them.

The newly built boats are generally launched on the spring tides, which inundate the banks, and float the boats without any other means being required. If a launch has to be made in summer or autumn, a very simple contrivance is adopted. The vessels are built along side the river, and lowered into it broadside on. Some of the log frames under the bottom are knocked out, and replaced by a row of inclined beams. Round poles are laid upon the beams, and act as rollers under the ship. The other supports are then removed, and as soon as the vessel stands only on the round poles, she slides into the water of her own weight. By reversing this process the vessels may be docked for repairing, re-sheathing, caulking, and other purposes, if it is not possible to make use of rising waters. Windlasses and hawsers are generally used for hawling up the boats out of the water, but such docking is only applied to small vessels. Barges 140 feet long and upwards are generally towed to a place suitable for repairing in time of full water, and great care is taken that the lowering of the water may cause them to lie evenly on the ground, without the risk of distorting them. When the vessel is dry, it is raised upon a stage by means of levers and beams, and levelled by the eye. The construction of schooners, brigs, and other river and seakeeled boats, is further complicated by the preparation of frames from patterns. Oak with a natural curvature is generally selected for this purpose, and they are placed near together, so as not to spring the sheathing while caulking. The planks used for sheathing the curved parts are steamed in special boilers. Iron is more plentifully used, the durability and solidity of the vessel being proportional to the quantity and strength of its fastenings.

The work of building these boats is not left to common carpenters, but is entrusted to ship builders, conversant with drawings, lining out, ship-outfitting and rigging. The building of warships on the Black and Azov seas has much tended to

improve the construction of these kinds of vessels. Formerly sailors used to serve in the fleet twenty years and upwards, the more competent ones were attached to the Government wharves where wooden ships were built, and their skill was imparted to those engaged in building trading vessels.

The cost of the vessels cruising on the rivers and seas given by the Statistical Department of the Ministry of Ways of Communication as follows: brigs, carrying 125 to 450 tons, cost from 1,000 to 16,000 dollars; schooners, 50 to 230 tons burden, from 250 to 3,500 dollars; *trembaki*, of 35 to 175 tons burden, cost from 250 to 4,500 dollars; *dubas*, of 15 to 100 tons burden, cost from 75 to 2,250 dollars; and *kosovias* for the Caspian Sea, of 6 to 100 tons burden, cost from 50 to 750 dollars.

The total number of river vessels, excepting steamers, in European Russia, not counting Finland, the Caucasus, and Poland, together with the boats built for one season only, may be numbered at 20,000 with a tonnage of 7,000,000. The total cost is about 17,500,000 dollars. The number of men employed on them amounts to 95,000, each vessel containing from 3 to 65 men. Until steam tugs were used, some of the boats had crews of 200 men, and as many as 100 horses and 400 men were used for towing them. The number of vessels built abroad, exclusive of steamers, is as follows: for the Volga, 10 iron barges, some of which cost 42,500 dollars each; for the Dnieper, below the rapids, 101 vessels, of which 71 are iron barges; above the rapids, 12 *berlinas*; 437 vessels were built in Prussia for the Niemen, including 259 wooden *batas* which last 50 years and more; 29 iron barges were built abroad for the Don, and 540 galleys for the Dniester were built in Austria out of Carpathian wood. In all 1,130, distributed as follows: 610 vessels in Austria-Hungary, 440 in Prussia, 40 in England, 9 in Sweden, and 31 in various other countries; many of the iron boats were imported in pieces, and put together in Russia.

As many of the vessels are freighted two, three, or even more times in a season the mean number, taken during the last ten years, of vessels freighted in a year is 56,344, and 83,308 rafts of 25 million logs. As regards the rafts, it may be mentioned that the American plan of fastening them with iron clamps driven into the wood, and bound with iron rods and chains, is not adopted in Russia. Most rafts are fixed together with poles fitting into eyes cut in butt the ends of the timbers. By this means more than a foot length of the best thick end of the wood is ruined, and has to be used as fuel; besides this, the method is slow and entails the use of much small wood for wedges.

The numerous vessels of the fleet, which has been described, give abundant work for the woodsmen, raftsmen, carpenters, black smiths and others, but do not tend much to their further improvement; whilst those boats which are only built for short service are not in the least economical. It will be observed that the river steam fleet of European Russia has quite a different influence.

RIVER STEAMERS.

The first steamer in Russia was built in 1813 by the ship builder Baird of St. Petersburg. In 1817 he applied for a patent, and was granted a monopoly until 1840. Five years after the expiration of the patent the Peterhov Harbour Company was formed. Four years later regular steamboat service and steam towing were

instituted on the Ladoga and Onega lakes; in 1852 there were 45 steamers, with an aggregate of 3,069 horse power, on the Neva basin.

Simultaneously with Baird in 1817 the iron master Vsevolozhsky constructed two steamers of 36 and 6 horse power, under his personal supervision at his own works at Povzhevsk on the Kama river. In the following spring the construction of a steamer with two engines of 16 horse power each was commenced. He was obliged to acquire the permission of Baird to be allowed to steam them; however, their trips on the Kama and Volga proved unsuccessful. The first two steamboats wintered on the Kama; their bottoms stuck to the bed of the river, and the spring waters submerged them; they were dismantled and the engines were used in the millwork. The third steamer reached Rybinsk, but returned to Povzha in a dismantled condition. In 1820 Mr. Evreinoff, with Mr Baird's sanction, ran five steamers on the Volga, 4 were of 16, and one, of 60 horse power. These boats used to ply from Nizhni to Rybinsk and Astrakhan. In 1826 Mr Shepelev built a steamer on the Oka for his private business. In 1836 an Englishman, Matthew Murray, built a trading steamer on the Oka.

In 1843, after the expiration of Baird's patent, the steamboat trade on the rivers of the Empire was open to all, and anybody was free to build boats. The Volga Steam Navigation Co. was founded in 1843, and has thus immortalized the date of the expiration of the monopoly. This society has flourished until the present day. The Perm Steam Navigation Company was then started, and afterwards the Nizhni-Novgorod Foundry and Ship Building Co. The profitable nature of the business brought forth private enterprise, and the iron works were greatly occupied in building steamers. In 1852 there were thirty steamers, with a total of 3,760 horse power, on the Caspian basin.

The first steamer on the Black Sea basin was built in 1823 at Moshny in the government of Kiev, on the estate of Prince Vorontsov; it was a steam tug for towing barks. Two years later this steamer was taken over the rapids of the Dnieper to Kherson. In 1846 Mr Maltzev's steamers began to ply on the Desna and Dnieper; then came a steamboat built by the landowner Puslovsky, followed by others. In 1852 there were seven steamers, with a total of 360 horse power, on the Black Sea basin. Steam service on the Dniester began in 1840, when the Government steamer «Prince Vorontsov» was used for towing vessels. In Archangel, on the Northern Dwina, steam navigation dates from 1848, and in 1852 there was only one 40 horse power steamboat there. In 1852 there were in all 148 steamers, on the navigable rivers of European Russia. Those on the basin of the Baltic were for the most part passenger boats, whilst on the other basins steam tugs were mostly required. The boats cruising in 1852 were built in the following order:

In 1825	1 steamer	in 1846	17 steamers.
1839	3 »	1847	17 »
1840	9 »	1848	12 »
1841	1 »	1849	9 »
1842	6 »	1850	27 »
1843	2 »	1851	20 »
1844	7 »	1853	16 »
1845	9 »	Total 148 steamers.	

After the year 1852, steamboats developed considerably, merchants acquired full confidence in them, capitalists invested largely in them, and realized good profits. Capstans were now used instead of horses, a windlass-apparatus was put up on the river Sheksna, and steam tugs completely replaced towing by men and horses. The steam tugs from Saratov to Rybinsk made five and even six journeys per season; freight fell to less than one-half; steamers were in great demand; the ironworks were overcharged with work; machine construction and iron rolling were developed and improved; skilful smiths, fitters, and engineers were turned out; and all this tended also to improve the construction of the wooden vessels to be towed.

From 1852 to 1869 the number of steamers grew to 623, with a total horse-power of 45,131; the boats being classed according to their horse power as follows.

D A T E S.	UNDER 50 HORSE POWER.	50 TO 100 HORSE POWER.	ABOVE 100 HORSE POWER.
	S t e a m e r s.		
1860	170	148	74
1865	201	198	77
1869	221	276	126

The mean efficiency of a steamer on the Volga is shown by the statistics of the Ministry of Ways of Communication for 1869, as follows:

60 HP steamer tows 1 barge carrying 1,050 tons					
80—120	»	»	2	»	2,000 »
150—200	»	»	3	»	2,750 »
250—450	»	»	4	»	3,550 »

One 30 to 40 horse-power capstan will pull 5,000 tons, and one 60 to 70 horse-power capstan, 8,000 tons.

The difference in the number of vessels falling to each steamer depends principally upon its speed. The steam tugs tow barges up stream on the Volga at the rate of 3.31 miles per hour, and the capstans do not give more than 1.65. If the latter consume less fuel it will be found that all this economy is used up by the steamer, which carries forward the anchor and then brings back the hawser to the capstan, which by this means propels the whole caravan. Besides this, as the hempen hawser is not less than 9 inches in circumference, it requires a good many spare hands to load it on the steamer. These ropes wear out very quickly, and rot in warm weather; they cost from 150 to 175 dollars per ton; a length of 3,500 feet weighs about fifteen tons, and therefore the usual hawser costs about 2,500 dollars. The long capstan caravans always meet with difficulties in the winding channel of the bends of the Volga, and also interfere with the progress of other vessels. They are now out of use, and their disappearance has brought about considerable improvement in ship building, as then no attention was paid to the prow,

midship, and curves of the vessels in tow, whilst the steamtugs always give preference to those which offer least resistance to the water.

From 1869 to 1879 the number of steamers did not increase very rapidly, but more regularly and in proportion to the requirements of increasing trade transport. In 1879 there were fifteen steamers, with a total of 925 horse power, cruising on the White Sea basin. They are all classed as passenger and goods-towing steamers; thirteen of them are iron, and two, wooden; two were built in St. Petersburg, two in Nizhni-Novgorod, five in Vologda, and six in Belgium. The first cost is put down as 269,175 dollars, or 291 dollars per horse power.

In 1879 the number of steamboats on the Baltic basin rose to 236; of these 54 were built in St. Petersburg, 48 in other parts of Russia, 25 in Finland and 109 abroad. At the same date there were 556 steamers on the waters of the Caspian Sea basin; of these 110 were passenger; freight passenger boats, 43; passenger tug boats, 21; tug boats, 342; chain cable boats, 24, and various, 16. At this time many steamers were already using naphtha fuel and it was also towed in barges in bulk. The new freights from central Asia, consisting of cotton, wool, hides, dry fruits, et cetera, also date from that time. In 1869 there were 54 steamers plying on the Azov Sea basin; 11 of them were constructed in Russia, and 43 abroad. There were 57 steamers cruising on the Black Sea basin; 9, below the rapids of the Dniester, and 48 above; 14 were built in Russia, and 43 abroad.

The total number of steamers plying on the inland waters of European Russia in 1879 was 918, and the building of their iron hulls, and also that of their machinery, became established on a firm footing in Russia. Engineering works were enlarged and the demand for machines increased, both for railways and river steamers. Great assistance in propagating knowledge and skill was afforded by special technical and mechanical institutions, and also by the war fleet, which inculcated into Russia the art of building iron and steel ships of war with all their machinery and armament. It is necessary to observe that up to the Crimean war the art of ship building was centralized in the war fleet; it seemed almost locked up, and only penetrated into the outside world by the agency of retired seamen. There were 20 working crews engaged in Government ship-building works on the White, Baltic, and Black seas. After the war, from the year 1860, the building department of the Marine commenced dispensing with Crown labour; in this manner 10 companies of soldier workmen were discharged, and the way was laid for private orders. By 1890 all the remaining working crews were done away with, and permanent gangs of artisans were organized as free men working for wages. Then the more special, arsenal, cartridge, and firework factories, as well as the workshops of the War and Naval departments, adopted hired labour, and greatly assisted in developing metallic industry and machine construction in Russia.

The further progress of steamship building may be followed by consulting the work of the Statistical Department of the Ministry of Ways of Communication. There was an account published towards the end of 1886, entitled «The River Steamer Fleet of European Russia according to the Census of 1884». In this list the merchant fleet includes 1,246 steamers with a total of 72,105 nominal horse power, and 6,099,581 pounds displacement, costing 48,896,050 roubles, and manned by 18,766 men. The cost of the steamers, reduced to an average by the Statistical Department, amounts to 650 roubles (325 dollars) per nominal horse power, and 582 roubles (291 dollars) per ton displacement.

Taking each type of vessel separately, the mean prime cost of the steamers is as follows:

Passenger boats . . .	853 roubles per HP, and 877 per ton
Freight passenger boats . . .	898 » » HP, » 644 »
Tug boats	564 » » HP, » 563 »

It is to be regretted that the information is wanting for former years, which would show the difference in the cost of building steamers at home and abroad, and also the relative prices for past and present years.

The fuel used on the steamers is also given in this account. The consumption during the navigation of 1884 was:

On 562 steamers	276,911 cubic fathoms of wood.
» 422 »	162,880 tons of coal.
» 261 »	219,725 tons of naphtha refuse.
» 1 »	712 tons of peat.

The coal was distributed thus: 32 per cent on the Neva basin, 5 per cent on the Northern Dvina basin, 10 per cent on that of the Dnieper, 19 per cent on that of the Don, and 37 per cent on the remaining basins. The Volga steamers were fed with naphtha refuse. Coal was used on the Dnieper only below the rapids. By distributing the fuel according to the class of steamer the following results are obtained:

Wood fuel . . .	70 passenger,	55 freight passenger,	391 tug,	27 chain cable boats
Coal	61 »	36 »	188 »	— »
Naphtha refuse	13 »	44 »	215 »	— »

The steamers are from 10 to 170 tons displacement, the majority of them carry from 35 to 90 tons freight. They are from 10 to 200, or more, nominal horse power; only 6 steamers are over 200 horse power. There are 160 steamers having from 100 to 200 indicated horse power; 17 with more than 600 horse power indicated; one tug boat on the Volga of 1,000, and 2 freight-passenger Volga steamers, of the American Mississippi type, of 1,500 horse power. According to the type of motors 810 are paddle steamers, 231 screw steamers, and 27 are chain-cable drawing boats.

From 1885 to 1890, 578 steamers were added on the inland waters of European Russia, and by January 1, 1891, there were 1,824 steam vessels afloat. The census of vessels is taken by the Statistical Department of the Ministry of Ways of Communication every five years; as the census of vessels which are always changing their position, or else passing from one owner to another, is a most complicated and difficult matter, a published list of them is not as yet available. It must be observed that there are not as yet in Russia any private statistics of navigation, either for scientific purposes, or for insurance and classification, like Lloyds or Veritas.

The list of steamers published by the Ministry in 1885 shows the type of vessel, horse power, dimensions, capacity, type of motor, material of which the vessel is built, kind of fuel used, date when the hull, engines, and boiler were constructed, where they were built, and finally the name of the owner. In order to follow the progress of steamship building in Russia, a table of steamers afloat, according to the census of 1885, is annexed.

RIVER BASINS.	S T E A M E R S B U I L T.									
	In all.	Dates.			In Russia.			Abroad.		
		Up to 1850.	Up to 1870.	Up to 1885.	Hull.	Engines.	Boilers.	Hull.	Engines.	Boilers.
Vistula	23	1	1	21	4	—	—	19	23	23
Niemen	14	—	4	10	—	2	—	14	12	14
Western Dwina. .	42	1	10	31	13	16	18	29	26	24
Dniester	5	—	1	4	1	1	1	4	4	4
Dnieper	144	6	35	103	34	28	54	110	116	90
Don	97	1	33	68	13	12	22	84	85	75
Narova	14	—	4	10	12	12	12	2	2	2
Neva	200	4	81	115	107	109	120	93	91	80
Northern Dwina .	69	3	18	48	35	24	26	34	45	43
Volga	761	6	304	451	580	550	595	181	211	166
Total. . .	1369	22	391	856	799	754	848	570	615	521

Amongst the firms which constructed steamers, engines, and boilers for the Volga basin, the following may be mentioned: Shipov in Kostroma, Zhouravlev in Rybinsk, Benardaki in Sormova, Haks in Kungoura, Motovilikhinski in Perm, Shepelev on the Vyksa, Vsevolozhsky on the Povzha, Milutin in Cherepovet, Strouve in Kolomna, and many others which spring up as steam navigation progresses. Besides this, many steamship owners build their own hulls, boilers, and even engines themselves, under the superintendence of practical engineers and naval officers. And, although the steel and iron vessels of this basin are built of materials which come from the Urals, where they are worked in limited quantities, the trade continues to increase. Its progress gives great hopes for the future, and this is borne out by the number of buildings which are being erected and the large sums expended for steam hammers, planing and drilling machines, and all other costly workshop appliances.

Although as yet no statistics have been published about the present state of river steam navigation in European Russia, yet the total number of steamers up to 1890 amounted to 1,824, and the following table may be compiled from the former data.

Sailing vessels on foreign seas . . .	2,870
Their capacity in tons	240,030
Number built in Russia.	2,418
» » » abroad.	391
Unknown where	61

When built:

Before 1870.	1,106
Between 1870 and 1880.	1,044
After 1880	613
Unknown when.	107

Capacity:

Below 50 tons	1,279
Between 50 and 100 tons.	924
» 100 » 200 »	397
Above 200 tons.	264

Registered to ports of following seas:

White Sea	460 vessels,	23,964 tons,	52 tons, average per vessel.
Baltic Sea	629 »	84,939 »	135 » »
Black and Azov . .	1,131 »	131,137 »	116 » »

As the sailing fleet consists almost entirely of wooden vessels, they are built in those places where wood is abundant. The whole of the White Sea fleet, with the exception of 10, was built in Russia. Out of the Baltic Sea fleet 49 vessels were built abroad. As the Black and Azov seas are adjacent to the steppes, 332 vessels of their fleet were built abroad. When the war fleet was composed of wooden vessels, Government ship building rendered great assistance towards building sailing vessels on all seas. Navigation classes were also opened in many seaport towns, in which the theory of shipbuilding was taught, and competent teachers practically taught the design of ships, their armament, cordages, et cetera.

Small sailing vessels are generally built on the shores of rivers and seas in temporary or casual slips. The larger vessels are built on ship-building wharves provided with covered places for the smith's shop and detail work; but for putting the ship together, and launching, it is not deemed necessary to sink capital in covered wharves, and so this work is almost always carried on in the open air. The cost of building sailing vessels amounts to 50 to 100 roubles (25 to 50 dollars) per ton displacement when fully loaded. The price and longevity of the vessels depends upon careful selection of the wood for the oak frames, the quantity of iron, the solidity of the fastenings, the thickness of the sheathing, the chains, anchors, et cetera. The life of a wooden vessel, plying on the open sea, is from 20 to 35 years.

The statistical section of the Custom house Department keeps a separate account of the Caspian Sea merchant fleet. Up to January 1, 1889, it comprised 1,131 sailing vessels, with a total capacity of 70,708 tons. Of these 1,091 were built in Russia, 1 abroad, and 34 not known where. These vessels are of various types schooners, brigs, barges, sea-going barges, and shallops. Their capacity varies from

50 to 600 tons, the average capacity being 62 tons. These vessels are either built on the banks of the rivers of the Caspian basin, or else on the shores of the Caspian Sea. The foreign vessel reaches the Caspian Sea through the Mariinsk system which connects that sea with the Gulf of Finland.

The activity of the whole sailing fleet of European Russia may be expressed by the number of arrivals in port during the year 1891 as follows:

Voyages abroad	733 vessels.	124,692 tons.
Coasting cruises	10,054 »	706,226 »

The number of vessels and tonnage cruising on each separate sea is shown in the annexed table.

	VESSELS.	TOTAL TON- NAGE.	MEAN TON- NAGE.
White Sea, outward bound.	241	14,763	61
» coasting.	436	22,652	52
Baltic Sea, outward bound	433	106,054	242
» coasting	2,516	131,764	72
Black and Azov, outward bound	54	4,876	90
« coasting	7,102	501,310	71
Caspian Sea, coasting	5,276	1,216,364	250

This table shows that the ships on the White Sea only make one voyage during the short navigation season. They are almost all engaged in the fishing trade, and are not used for carrying freights. The Baltic Sea vessels accomplish a voyage and a half per season; here the sailing vessels are disappearing and making way for steamers and services of steamers, much to the advange of trade, commerce, and the inhabitants of the shore. On the Black and Azov seas, where the navigation season is longer, the vessels make four voyages. The activity on the shores of these seas is growing fast; and it seems strange that capitalists shrink from investing money in building steamers for the coasting trade, which is only permitted by law under the Russian flag. The sailing vessels on the Caspian Sea are able to make eight voyages; their chief freights are: naphtha and its products, timber from the Volga, and cotton from Central Asia to the Volga.

The steam merchant fleet on the external seas of European Russia up to January 1, 1892, consisted of the following:

	Vessels.	Tonnage.	Horse power.
White Sea	20	2,748	1,129
Baltic Sea	92	19,776	6,558
Black and Azov	249	84,559	21,721
Total	361	106,813	29,408

Of these, 51 were built in Russia, 304 abroad, and 6 unknown. Sebastopol takes the lead in steam ship-building with 13 steamers, next comes Riga with 11, then Rostov-on-Don with 10 steamers, Odessa 5, Kalach 4, Nicolaev 4, Kherson 3, St. Petersburg 2, and the government of Archangel 2, one of which was built by the works on the Solovetsk islands. After the introduction of the metallurgical industry into the south of Russia, that is, dating from 1887, at Rostov-on-Don 4 steamers were built, in Kherson 2, in Nicolaev 2, in Kalach 1; in 1890 one wooden tug boat, of 46 tons register, was built in Odessa. It is evident that in the south of Russia, where coal, iron, rivers, and sea lie side by side, ship-building will make great progress. The oldest steamer built abroad is the «Maimak» a tug boat of 67 tons register made of wood; she was built in England in 1837, and is still doing good service.

Burden.			Nominal horse power.		
Under 100 tons . .	153	steamers.	Under 50 HP . .	141	steamers.
» 500 » . .	150	»	» 100 » . .	134	»
» 1000 » . .	35	»	» 200 » . .	44	»
Above 1000 » . .	22	»	Above 200 » . .	25	»
Unknown	1	»	Unknown	17	»

The activity of the foreign trade of the 361 steamers, afloat on the open seas in 1891, is expressed by 654 arrivals, with 486,180 tons import freight, to all the Russian ports. In the coasting trade these 361 vessels showed 18,653 arrivals, with 8,000,678 registered tons freight. This was distributed among the separate seas according to the following table.

	FOREIGN.		COASTING.		TOTAL.	
	Vessels.	Tons.	Vessels	Tons.	Vessels.	Tons.
White Sea	12	5,508	212	51,452	224	56,960
Baltic	290	119,314	1,749	415,282	2,039	534,596
Black and Azov.	352	361,358	16,692	7,533,944	17,044	7,895,302
Total . . .	654	486,180	18,653	8,000,678	19,307	8,486,858

This table shows that each steamer has on the average made 53 cruises in one season, and carried an amount of freight equal to 80 times its own capacity. This excessive activity of the steam fleet, principally in coasting voyages, clearly shows that the commercial development in Russia has exceeded that of ship building. The classification according to separate seas demonstrates this fact still more clearly.

	ENTERED.		ARRIVALS.		NUMBER OF CRUISES.	
	Vessels.	Tons.	Vessels.	Tons.	According to vessels.	According to tonnage.
White Sea.	20	2,478	224	57,960	11	23
Baltic Sea.	92	19,776	2,039	534,596	22	27
Black and Azov	249	84,559	17,044	7,895,302	69	93

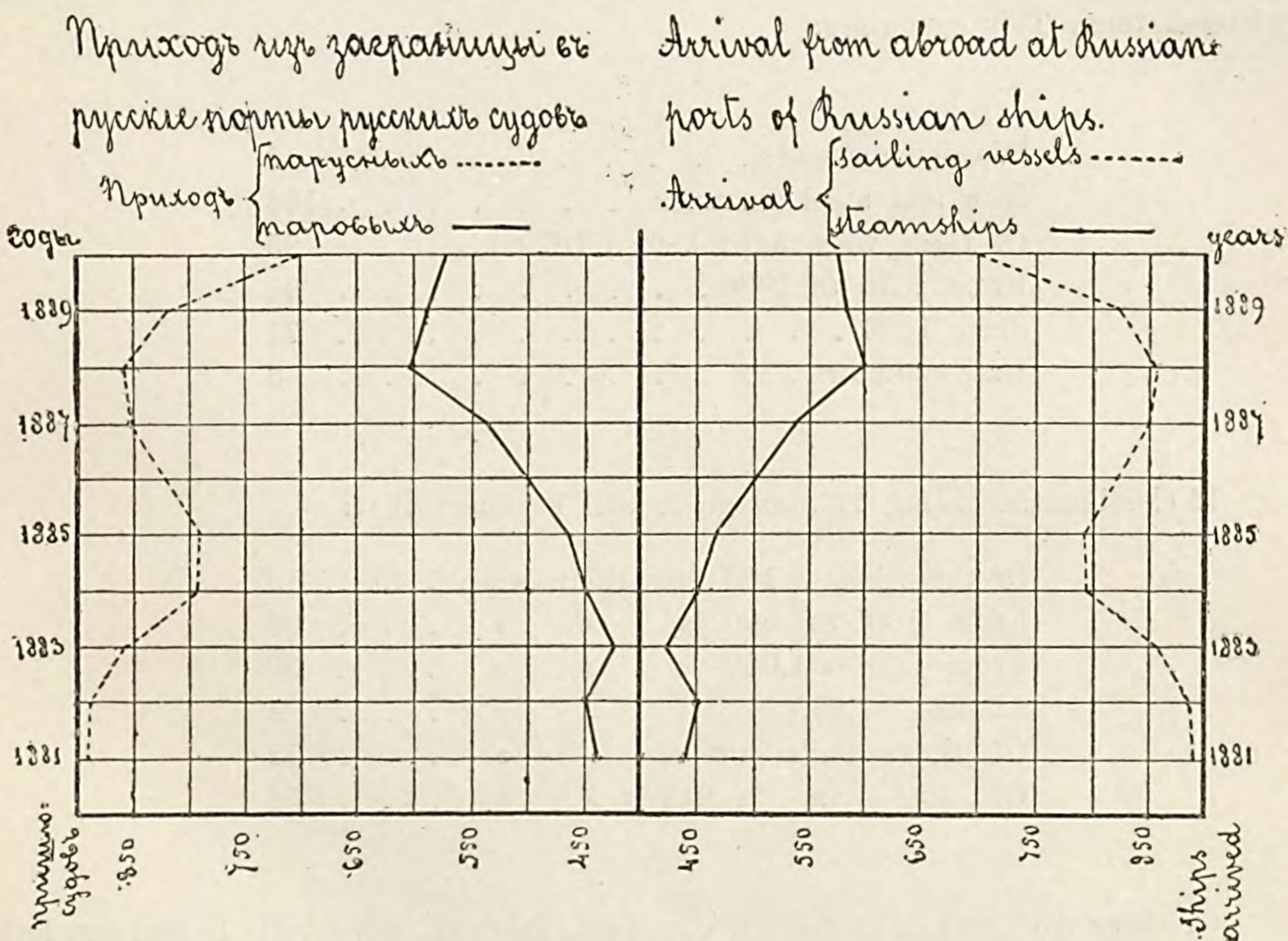


Diagram № 2.

Showing arrivals in Russian ports of Russian vessels from abroad; the vertical line showing the dates, and the horizontal line the number of ships; the sailing ships are designated by a dotted line and the steamers by a continuous line.

Hence, in the Black and Azov seas, each vessel made 69 cruises and carried 93 times its registered tonnage. Notwithstanding this great success, ship building advances much too slowly, and the transport trade on these seas is as yet nothing compared to what it will be. It must be borne in mind that the Caucasus was only conquered twenty-eight years ago, that railways have only been in general use about twenty years, coal mines have been in work for about fifteen years, metallurgical industry was only started some five years ago, and that the colonization of the Caucasus

and the region beyond the Caspian, and the road making there, has hardly been commenced. In spite of all this stimulus to create a merchant navy for foreign and coasting trade, the lack of capitalists makes money scarce for maritime business, and many are loth to take the risks of embarking in it; the high price of iron and steel for ship building and machine construction is also a serious obstacle.

It can be seen at once that the Caspian Sea fleet was the outcome of the petroleum trade, and has increased in proportion to it. The total number of steamers on the Caspian Sea was registered as 141; up to January 1, 1892, 16 were from various causes struck out so that at present there are 125, with a total tonnage of 48,842 registered tons: This comprises:

Wooden steamers	1
Iron and steel steamers	124
Of these were built before 1870	25
From 1870 to 1880	21
Since 1880	71
Date unknown	8

If classified according to tonnage it will be found that:

Of those below 100 tons there were	19
From 100 to 500 » » »	68
From 500 » 1,000 » » »	36
Above 1,000 » » »	2
Of those built abroad » » »	72
Of » » in Russia » » »	54

Of those constructed in foreign countries, forty-six were built in Sweden, forty in England, and one in Belgium. Those steamboats less than 150 feet long were conveyed from the Baltic Sea to the Caspian through the locks of the Mariinsk system. The longer ones were transported along the Volga in sections; and since 1880 a special type of steamer built in two sections has been made, each length being conveyed separately through all the locks, and then joined together in the Sheksna or Volga.

Fifty-four sea-going steamers have been built in Russia, of which fifteen came from Finland, and two from St. Petersburg; so that only thirty-seven were built on the Volga basin, and out of Ural iron. This small share of the Russian iron works towards ship building is due to the fact that, simultaneously with the increase of the Caspian Sea steam fleet, the iron works of the Ural were greatly engaged with railway work, and in building river steamboats. The Ural iron also, being smelted with charcoal, was unable to supply the demand for it and rose in price, so that the ship-

owners were obliged to place their orders abroad, where they also obtained easier terms.

The Sormovsk Works, belonging to the heirs of Mr. D. E. Benardaki, took the most active part among the Russian ship building firms. Their works are situated on the Volga about 7 versts above Nizhni-Novgorod, but even they have only built twelve steamers for the Caspian Sea since 1872. The other works have built respectively: Spassky-Zaton, 5 steamers; Astrakhan, 4; Kolomna and Balakhna, 3 boats each; Perm, Kostroma, Rybinsk, and Lubimovsk works, 2 boats each; Tsaritsin and the Votkinsk works, one boat apiece.

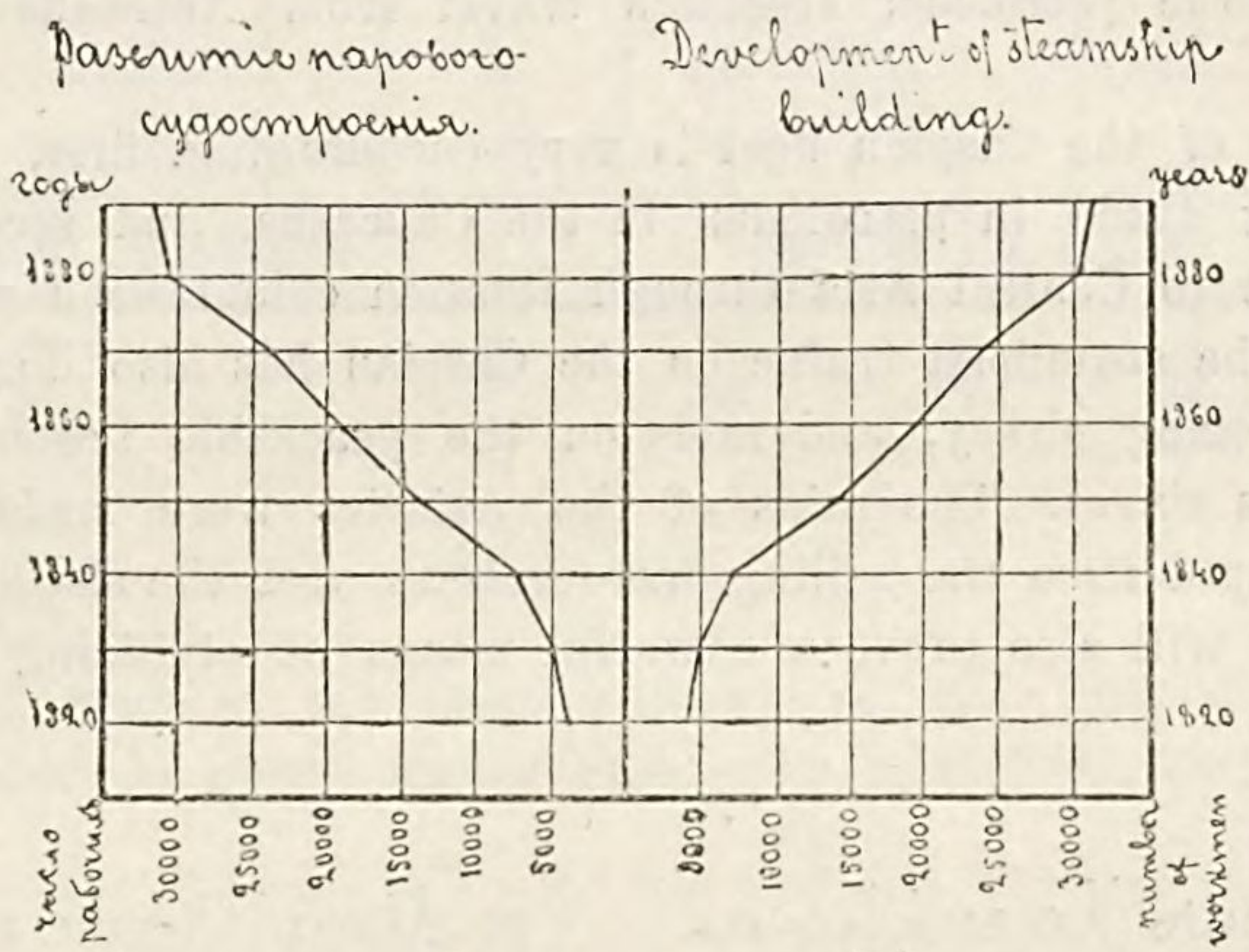


Diagram № 3.

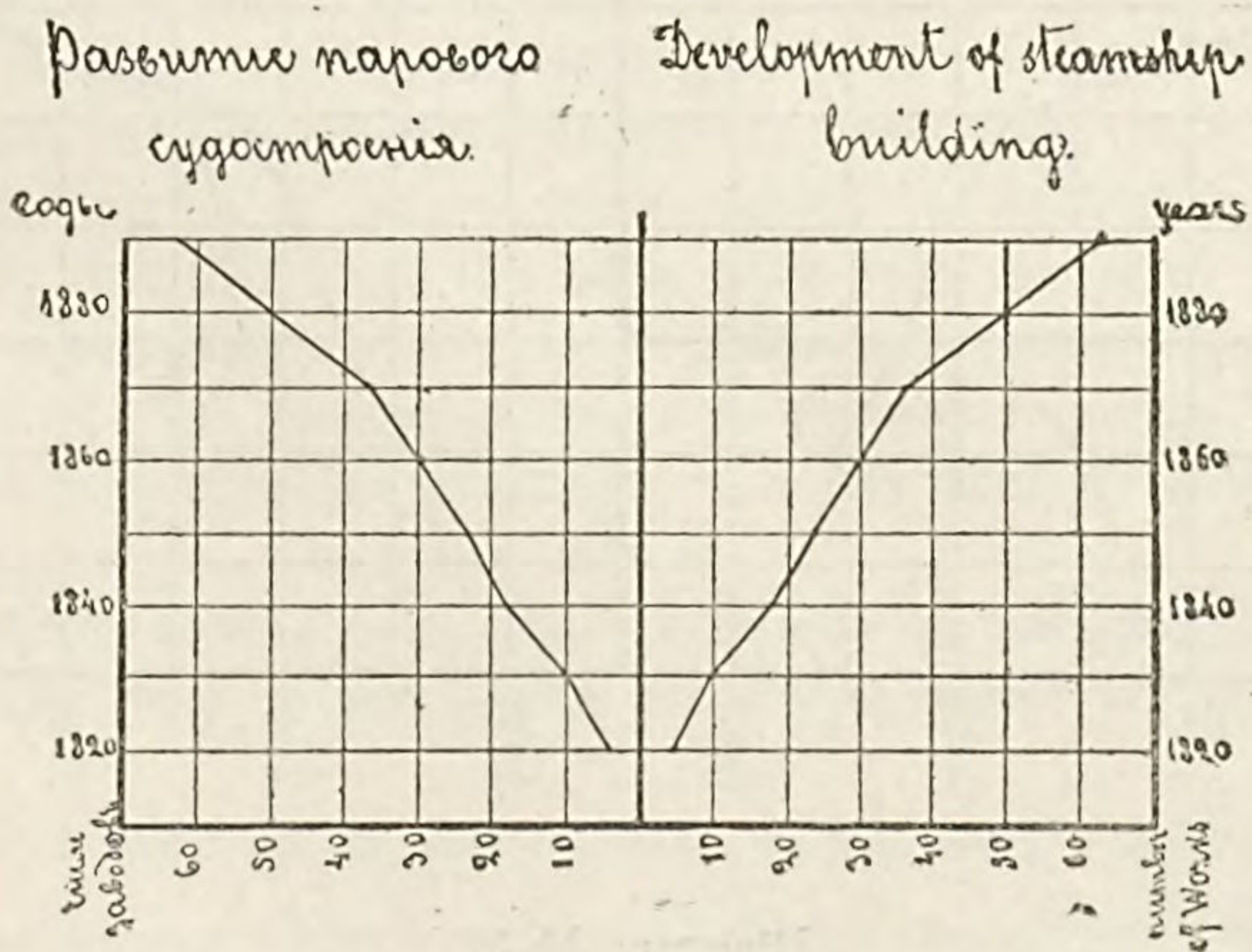


Diagram № 4.

Diagrams, Nos. 3 and 4, show «The growth of steamship building»; No. 4, according to the number of iron works. The vertical line represents dates, and the

horizontal line the number of ship-building yards and foundries which sprang up. № 3 represents the same, with reference to the number of workmen, the dates being in a vertical line; and the total number of hands employed in all the yards and works are shown in a horizontal line.

The activity of the 125 steam vessels of the Caspian Sea in 1890 is expressed by 5,876 arrivals to all ports, with a total tonnage of 1,374,004, so that each steamer made 49 cruises during the season. The mean capacity of a steamer being 391 registered tons, each of them transported 28 times this quantity, or 11,450 tons. Almost all the petroleum steamers travel from Astrakhan to Baku without freight.

The future of the Caspian fleet is very encouraging, first, on account of the steadily increasing trade in petroleum in the Caucasus, and second, on account of the impetus given to Central Asia through Russian colonization and the railway line to Samarkand. The steamboat traffic on the Caspian has also done good service in completely suppressing piracy, and raids on the peaceable traders for the purpose of selling them as slaves. The raids of the Asiatics were made with light boats, which easily escaped from the sailing war cruisers over the shallows and sand banks. The Caspian fleet will also prove a powerful means of civilizing the semi-barbarous regions of Asia.

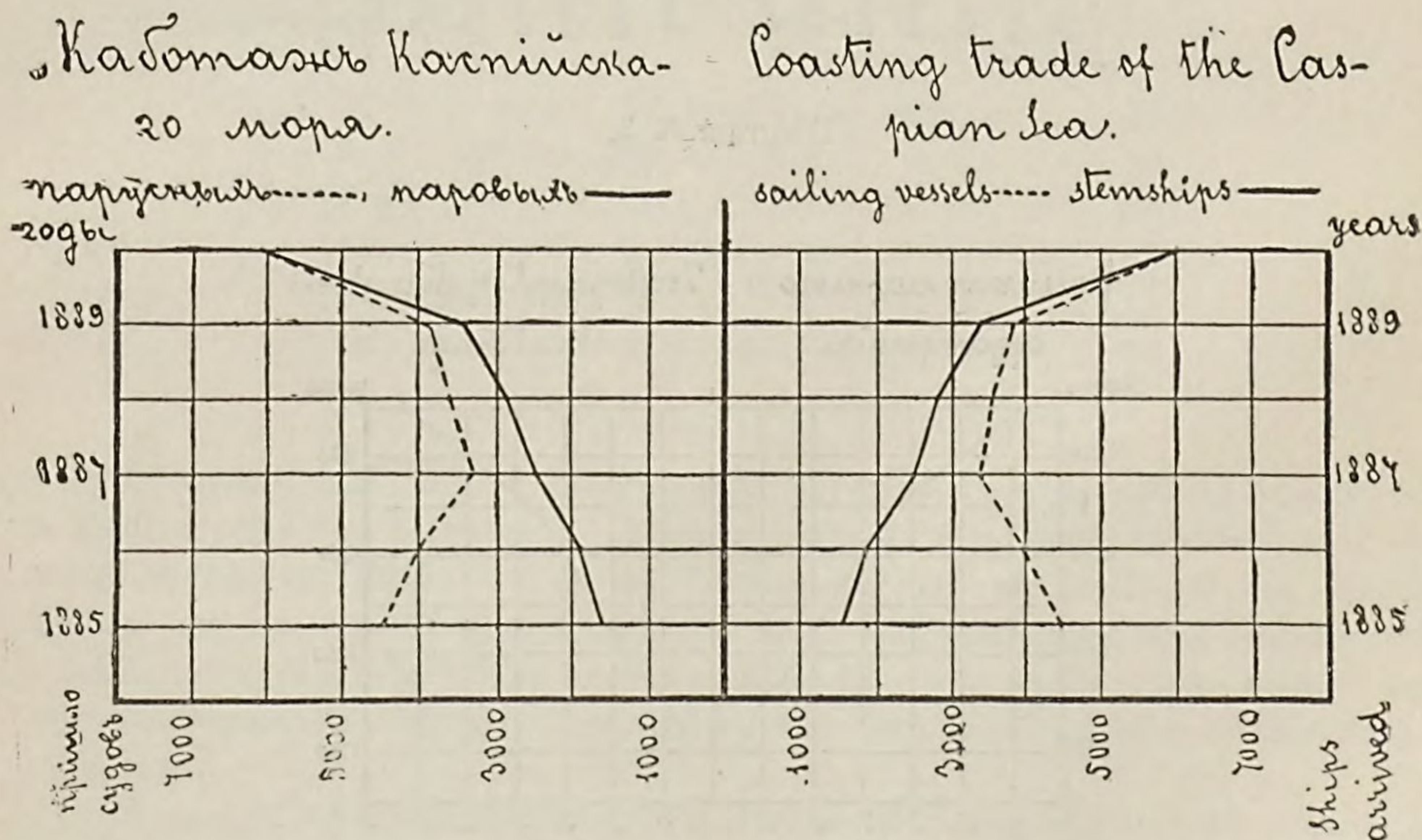


Diagram № 5.

«The coasting trade on the Caspian Sea»; dates shown in vertical lines, and the arrivals of vessels in horizontal lines; dotted lines signify sailing vessels, and continuous lines, steamers.

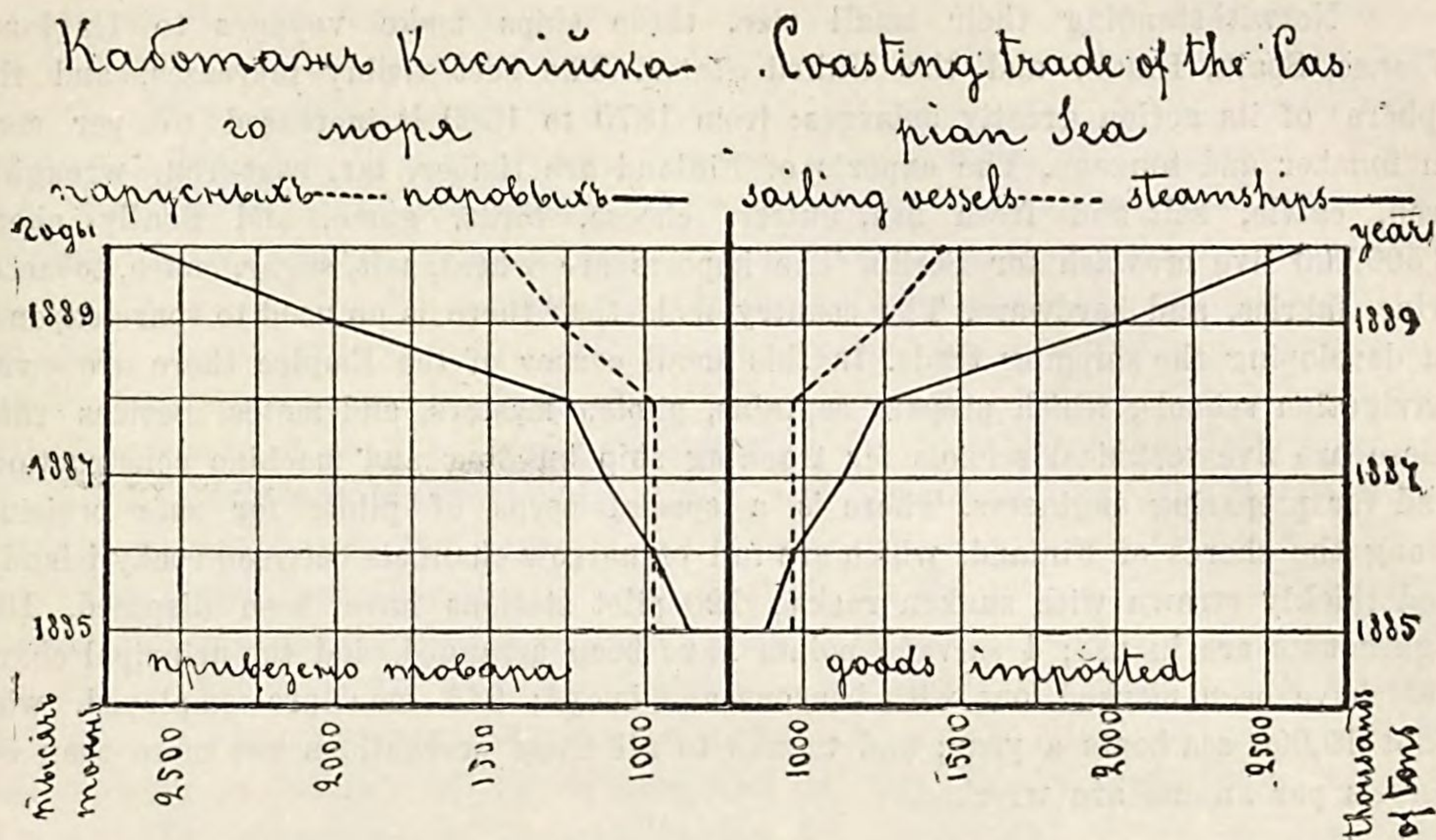


Diagram № 6.

«The coasting trade on the Caspian Sea»; vertical lines showing dates, and horizontal lines import of goods; dotted lines refer to sailing vessels, and continuous lines, to steamers.

THE MERCHANT FLEET OF FINLAND.

Thanks to the position of Finland, its shipping and ship-building trades were developed at an early date. In an area of 144,242 square miles of this portion of the Russian Empire there is a surface of 18,560 square miles of lakes. The seashore is indented by gulfs and surrounded with islands, whilst the inland lakes are connected by many full rivers. It is a country created for navigation; and by the indefatigable energy of its inhabitants the lakes have been connected with the seas by canals, and the whole country, even to the most remote corners, covered with a network of water ways. The country abounds in fir woods suitable for ship building, is rich in bog and lake ores, for producing iron and steel for steamers and engines, and the people have a great taste for the sea.

There are 9,300 vessels with 1,391,240 tons of merchandise which leave the Finnish ports every year. From 15,000 to 18,000 vessels ply along the canals for inland cruising.

The following table shows the capacity of the sea-going ships:

V E S S E L S.	UNDER 200 TONS.	UNDER 400 TONS.	UNDER 600 TONS.	ABOVE 600 TONS.	TOTAL.
Steam	290	18	2	2	312
Sailing	1,398	269	79	50	1,796

Notwithstanding their small size, these ships make voyages to England, France, Spain, Brazil, and the United States. The fleet visibly increases, and the sphere of its action greatly enlarges; from 1879 to 1889 it increased 67 per cent in number and tonnage. The exports of Finland are timber, tar, cast-iron, wrought-iron, cattle, salt and fresh fish, butter, cheese, birds, game, and finally about 3,500,000 live crawfish for Berlin. The imports are wheat, salt, sugar, coffee, tobacco, wine, fabrics, and hardware. The country feels that there is no need to spare expense in developing the shipping trade. In this small corner of the Empire there are seven navigation schools, which prepare captains, pilots, masters, and mates. Besides this, there are five technical schools for teaching ship building and machine construction, and for preparing engineers. There is a special corps of pilots for safe cruising along the shores of Finland, which are full of narrow channels between rocky islands, and thickly strewn with sunken rocks; 120 pilot stations have been disposed, 109 lighthouses are in use; 4 salvage points have been arranged, and the principal channels have been marked out with beacons and buoys; 943 men are employed, who pilot 12,000 sea boats a year; and thanks to all these precautions not more than 30 vessels per annum are wrecked.

THE BUILDING OF WARSHIPS.

This sketch would not be in any degree complete without touching upon the construction of warships. During the last twenty years there has not been in any branch of enterprise so many discoveries as in naval architecture. All kinds of scientific inventions have been applied, all nations have competed for what was newest and best. The whole world, at the expense of hundreds of millions upon experiments and alterations, has transformed ships of war into floating mechanical appliances of an unsinkable and impenetrable nature, and the treacherous ocean has become the best and cheapest means of international communication. In Western Europe and in the United States, the ship building of the merchant navy is in advance of that of the fleet; but in Russia it is the reverse; the war fleet, representing the force of intelligence and initiative in marine affairs, was in front of the private enterprise which followed in the rear, making use of the results attained by the Government.

The geographical position of Russia renders it necessary to maintain four fleets on different seas, and these fleets have always been schools of regular ship building. When the war vessels were built of wood, private ship builders adopted the method of selecting and classing timber practised by the Government naval architects, and also used the same terminology, and acquired in this way so much skill that their ships were not inferior to those of other nations. When the wooden sailing vessels gave place to iron steamers, the Imperial fleet was the means of raising the metallurgical industry in Russia, placing it on a level with that of other countries, and in this way did away with the necessity of ordering the ships to be built abroad. The private enterprise of the iron masters and ship builders quickly responded to the demands of the Government; capital was disbursed, large orders received,

engineering skill improved, and a class of intelligent builders and artisans sprang up. The fleet had also a powerful moral influence upon the merchant navy. The short term of military service introduced in 1873 had the effect of spreading knowledge, order, and discipline. It also prepares seamen, stokers, oilers and engineers. These men, after serving their time, diffuse their knowledge and orderly habits into the merchant navy, serving as an example to their new comrades, and in their turn formed a new set of active recruits for the fleet. The studies and investigations of specialists (naval officers) in the application of galvanism, electricity, torpedo work and mechanical contrivances of all kinds, have done much towards the propagation and advancement of science. It may be said that the fleet has been entirely reformed within the last generation, so calmly, firmly, and completely, that the unbiassed observer may contemplate the future of the Russian nation with astonishment.

The Naval Administration in 1856 worked out the project for the Black Sea Navigation and Trading Company, and raised it to such a condition that the large steamers of that Company make regular trips, not only in the Black and Mediterranean seas, but also between the ports of India, China and other distant countries, thus showing an example of the development of the Russian trade fleet for long voyages. The importance of the Caspian Sea was appreciated almost at the same time, when after the Crimean war it became a question of sinking the whole of the Black Sea fleet, and the Caucasus was quite cut off from the rest of Russia by Sea. The Caucasus and Mercury Joint Stock Company was then organized. In the event of a blockade of the Black Sea, this company was able to supply the regions beyond the Caucasus with troops, provender and Government stores, and have a general influence upon Persia and the Turcoman steppes. Moreover, the Ministry of Marine conducts hydrographic work on all the adjacent seas, publishes maps of all parts of the world, and maintains all the lighthouses.

This same Ministry, with the object of acquainting the inhabitants of the continent of Russia with the importance of its marine business, took the lead in the private enterprise of organizing the polytechnic exhibition of 1872 in Moscow, held in commemoration of the two-hundredth anniversary of the birth of Peter the Great. It was here that the idea of instituting the «Society for the Assistance of Russian Trade Navigation» originated, which strengthens the bond between trade, industry, and navigation. It is under the exalted protection of members of the Imperial family; it has founded schools of seamanship, propagated practical knowledge of navigation, and finally taken upon itself the initiative in the organization of a volunteer fleet. A subscription equivalent to 2,000,000 dollars was raised; and during the ten years existence of this fleet, regular voyages of Russian ships to the shores of the Pacific Ocean have been started, and on their return voyages these vessels import a very considerable quantity of Chinese tea into Russia. At present this fleet, besides its huge transport ships, possesses three swift steamers, always ready to be used as auxilliary vessels for the ocean war fleet.

Until the Crimean war, the Russian fleet, distributed upon the White, Baltic, Black, and Okhotsk seas, was almost entirely composed of wooden sailing vessels. As regards power, speed, and sailing qualities these ships were very efficient. The fleet consisted as follows:

Line-of-battle ships	40
Frigates	40
Corvettes, brigs, schooners, tugs, yachts, and tenders.	61
Various other vessels	45
Pilot and loading boats	42
Transports	76
Row boats	105
Total	409

These ships carried 5,453 guns. At that time the steam fleet was regarded as a sort of auxiliary to the sailing fleet, and before the war of 1853, it was constituted as follows:

Steam frigates, completed	16
Small steamers, >	36
Screw transports, under construction	3
Screw frigates	3
Screw corvettes	2
Screw steamers	2
Total	62

This fleet carried 202 guns, with a total of 11,470 horse power. Moreover, there were also eight small steamboats, with sixteen guns, on the Caspian Sea.

The first paddle-boat of the naval department was the *Skory*, («The Swift»), built in 1817 at the Iron Works of Izhora near St. Petersburg. It was used for harbour duty, and was 60 feet long, 14½ feet wide with a draught of 7 feet; it had a 30 horse-power engine, and lasted twenty-two years. From 1817 to 1840 twenty-three steamers, having from 15 to 140 nominal horse-power, were built for the Baltic fleet. Eight of these were made abroad, two at private Russian works, and thirteen at the Government wharves in St. Petersburg. Between 1840 and 1850 eleven steam frigates, with 200 to 540 nominal horse power engines, were built; of these the *Kamchatka* was built in New York, the *Vladimir* in Liverpool, and the remainder in St. Petersburg. The first steamer of the Black Sea fleet, the *Vesuvius* was built in 1820 at Nikolaev; she was 94 feet long, 20 feet wide, and drew 9 feet of water. From 1820 to 1853 thirteen steamers for the Black Sea were built at Nikolaev, and twenty-six in England, including seven steam frigates with 260 to 400 horse power engines. The first 40 horse power, steamboat for the Caspian Sea was built in 1828 at the Government admiralty of Astrakhan. From that time till 1853 ten more steamers, of 40 to 100 nominal horse power, were constructed. Four of these were made of wood at Astrakhan, two of iron at the Votkinsk works near the Kama river, three in England, and one in Holland, and which was brought over in sections.

During the hard time of the Crimean war, the country ceased to depend upon

foreign firms for building Men of War and began to develop its own Governmental and private works. In two years seventy-five screw gunboats, and fourteen corvettes, were built and supplied with Russian engines, the materials used being larch, pine, and oak. Each boat cost on the average 10,000 dollars. The engines were high pressure, 50 to 75 nominal horse power, made at Government and private foundries at a cost of 9,458 dollars each. Fourteen corvettes of 200 nominal horse power, carrying eleven guns each, were built in St. Petersburg by Government and private firms, of the same materials as the gun boats, at a cost of 50,500 to 62,000 dollars each, the engines costing 25,000 dollars each. At the same time the sailing vessels were changed into screw steamers, Engines of 360 horse power were already at that time being constructed in Russia.

On the White Sea, six steam clippers of 150 horse power were built by the Government at Archangel; they were made of wood, and brought to Cronstadt after the war. The cost of the hull of each of these boats was 31,990 dollars; and the engines, 20,000 dollars apiece. Naturally, the short space of time allowed for building these vessels prevented the work from being carried out in the best manner; still the engineers, artisans, and architects, having had much experience in ship building, did very good work considering the little time allotted them. After the treaty of Paris, the Naval Department commenced a regular and systematic reorganization of the fleet, and of ship building in Russia with home materials. The views of the late Emperor concerning the position of the fleet are expressed in the following words: «Russia must be a first class naval power; her fleet must take rank in Europe after those of England and France, and must exceed in strength the united second class naval powers». The ship-building sphere of the Ministry of Marine was therefore accordingly determined from that date.

For carrying out this plan, wharves, docks, and harbour works were instituted, the best drawings and information concerning all improvements were obtained, capable officers were sent abroad to study special branches of science, and the «Naval Magazine» was enlarged to facilitate a free exchange of opinions between competent persons. Although financial circumstances were somewhat straitened after the war, still from the treaty of Paris until 1863, the Baltic fleet comprised the following wooden screw steamships:

Three deckers	3
Frigates, 2 built abroad	7
Corvettes, 1 built abroad	6
Clippers, 1 built abroad	7
Sea gunboats, 1 built abroad	3
Total	26

During the civil war in the United States the ironclad «Merrimac» revolutionized the construction of warships, and the whole world commenced building armour-plated vessels. Every year brought forth new inventions and it became necessary to establish within the country all the means for ship building, and to develop and support all the private ship-building firms and engineering works. The first ironclad,

Pervenets («The Firstborn») was built in England in 1863, and brought to Cronstadt; the second, *Ne tron menya* («Touch-me-not»), was built in Russia. In order to quickly establish an ironclad fleet, two wooden 58-gun frigates were covered with 4½-inch armour plate, ordered in England. Monitors, turret ships, and batteries were then commenced, and in 1863 the building of iron and armour-plated vessels was already on a firm footing in Russia.

In January, 1870, the Baltic ironclad fleet consisted of twenty-three vessels with 162 guns with a broadside charge of 24,256 pounds. The total nominal horsepower was 7,110, and the total displacement 61,390 tons. In 1870 it became necessary to adopt a new class of vessels, called ocean cruisers. During the Turkish war of 1878, four cruisers were bought in the United States; and then a whole fleet of ironclad cruisers was built in Russia, terminating in the launch of the «Ruric», a vessel of 11,000 tons displacement, built at a Russian ship building yard out of home materials.

In the list of vessels, edited by the Department of Trade and Manufactures in 1890, there are 210 of various kinds in the fleet on all the seas of Russia; this is a list of vessels of more than fifty tons displacement. The future condition of ship building in Russia is so well guaranteed by the excellence of the foundries and ship building yards, of materials, staff and workmen, that there are at present in course of construction for the Baltic Sea, four squadron ironclads, two ironclads for coast defense, two torpedo cruisers, one training ship, and five torpedo boats. At the same time there are in course of construction for the Black Sea, one squadron ironclad, one torpedo cruiser and one steamer. The Russian Marine Department is latterly very independent as to the type of its warships, not following the samples of the different countries of Western Europe. Thus for example, the ocean cruisers with their broadside armour plates are of original Russian type, as well as the first sea torpedo boats. In details the building of Russian war ships has many independent methods. All this speaks for itself.

It is well known that the legislative measures referring to private ship building have done much to assist its further development. The history of Russian law, guarding the liberty of cruising on all inland rivers, and that of ship building, dates from the year 1649, or from the code of the Tsar Alexis Michailovitch. These laws were then supplemented in the beginning of the XVIII century, particularly during the reigns of Peter the Great and his successors; and up to the present time the legislation jealously guards the right of cruising for Russian subjects upon all waters of the Empire, and reserves the right of coasting for the exclusive benefit for Russian subjects. These protective legislative measures laid the foundation for the development of Russian navigation, especially along the seashores. In order to encourage the progress of this important branch of trade, navigating premiums were also granted to certain enterprises which bound themselves to carry the mails, and keep up a regular time service along the shore lines, and to distant ports.

In the Forestry Statute, ship building is subject to certain privileges in the matter of obtaining timber. By civil law all owners of water and banks are forbidden to put any obstacles in the way of timber or vessels afloat. The boundary laws decree that towing paths shall be measured off from the landowners, for the free use of all who may require them. The statute of ways and means decrees that along these towing paths anyone

shall be at liberty to build, caulk, tar, or repair vessels. The statute of commerce gives detailed regulations about ship-building contracts and deals with the rights of ship building, the plans, estimates, and materials used for merchant vessels, and the examination of sea ships. There is an advantageous scale of deferred payments instituted for the customhouse duties on vessels built abroad. It must, however, be observed that of late years so many new and important legal questions have sprung up in connection with navigation and ship building, characterized by the fact that up to the present time most of the Russian exports are conveyed abroad in foreign ships, that a special commission has been formed in the Ministry of Finance for enquiring into the best means of protecting and developing Russian trade, navigation, and ship building. Besides this, of late years much attention has been given to improving the river systems, and seaports like Marioupol on the Sea of Azov, Libau on the Baltic, and others; but information on these subjects, which are vital economical questions, pertain to the sphere of action of the Ministry of Ways of Communication, which has prepared a Special Review of the land and water communications of Russia, for the World's Columbian Exhibition.



CHAPTER XXII.

Carriage Manufactures.

THE enormous extent of the Russian empire, with its varied conditions of climate and soil, with its well-constructed ways of communication in some places, and its primitive roads in other districts, naturally involves an equal variety in the types of equipages used in travelling over the different parts of the country. Thus, in the Caucasus, besides equipages of the ordinary type, two-wheeled tilted carts (*arbie*), having wheels two and a half arshines high, and without iron bracings, are met with. On the opposite frontier, in Finland, are seen the so-called *dvoukolkie*, vehicles on two wheels, without springs, and which in districts contiguous to large towns are replaced by similar conveyances on springs. In the western provinces are still greater varieties: the *brietchka*, a half-covered carriage, and the *neitychanka*, which has sometimes a hood and sometimes not, and is with or without springs. In central Russia there are equipages of a very original and primitive character: the *teleiga*, a kind of cart, the earliest type of country conveyances, and the one most in use to the present day; the *tarantass*, a roomy travelling coach, the most widely spread type of a Russian summer travelling equipage; and lastly, the *droshky* and *proletka*, or hooded droshky, the equipages mostly used in towns and cities. The first winter fall of snow has scarcely covered the ground, when over all Russia wheeled vehicles are replaced by sleighs. Russian sleighs are lower in their underframe than the American, and are at the same time more comfortable, since they are buttoned over with a covering to protect the legs and feet from the cold. Russian town sleighs are further distinguished from the American in the construction of the coachman's box, which is in front, and a little higher than the seat for those riding in it, whilst the fore-partition rises to the coachman's belt, the sides being also closed in with wood, or leather hangings, so that his legs and feet are well protected from the frost. They have sometimes been criticised in Western Europe as not being sufficiently comfortable, but it must be acknowledged that, in their construction, they are admirably adapted to the rigorous winters of Russia. The town sleighs are often remarkable for their fine work and elegant finish. The wooden parts

are often veneered with oak, curled beech, and other woods of a superior kind. The lap-cover is either of cloth trimmed with fur, generally bearskin, or is made entirely of fur; in the latter case, owing to the high price of the fur, the lap-cover often costs more than the sleigh itself, especially if it be of American bearskin, which is highly valued and esteemed in Russia, and a cover of this kind is considered to be a necessary accessory of the more fashionable sleighs.

Sleighs in the provinces are naturally of a simpler and cheaper construction, being made of common, and generally unpainted wood; on the seat is a cover that hangs down over its back, and they are also provided with a cover for the legs. Sleighs are always made with shafts and a shaft-bow, and are for one, two, or three horses. In sleighs drawn by two or three horses, (troikas), the thill-horse goes at a trot, whilst the off-horses gallop, with their heads bridled down and turned a little out; sleighs with two horses are used only in towns, and in the western districts form the ordinary kind of town sleighing. Travelling sleighs are generally covered, are furnished with lap-covers, and are curtained in for protection from the cold and wind.

The manufacture of sleighs and carts (*teleigi*) in Russia dates from an early period, and has long been extensively carried on in the two capitals, where special cartwright works, afterwards converted into coachworks, were founded. Peter the Great, always the leader in word and deed of every social movement, did not neglect this branch of industry. In the Court Stable Museum at St. Petersburg, which contains the largest and richest collection in the world of equipages and harness trappings, is still preserved a covered winter sleighing coach, made with his own hands. Sleighs, completely closed in like carriages, have from the earliest time been adopted in all parts of Russia for long winter journeys.

Equipages having any pretension to elegance or luxury were not known in Russia before the reign of the Empress Elisabeth. The first carriage of this kind was a present made to the Empress in 1746 by Frederic King of Prussia. This carriage is still to be seen in the above-mentioned museum. It would appear to be of London manufacture, and is hung on straps. This carriage was repaired in 1856, and was used by the Empress Marie Alexandrovna for her triumphal entry into Moscow, and also in 1883 for the state entry into Moscow of the reigning Empress Marie Feodorovna on the day of the Coronation.

About the same time, that is, towards the middle of the eighteenth century, there was made in St. Petersburg a covered winter two-seated *droshky* (*lineika*). Its front and back parts were painted in gold, its corners were adorned with gilt-carved woodwork, and the upper part with flowers moulded in brass. In this *lineika*, as is well known, the Empress Elisabeth Petrovna travelled from St. Petersburg to attend the ceremony of Coronation at Moscow, and it is kept to the present day in the arsenal of that city.

State Court equipages were after that time more than once ordered from abroad. In the Court Stable Museum, 41 such equipages of different kinds, phaetons, barouches, vis-à-vis, and sleighs, are still kept; some of them being of foreign, others of Russian make. All these equipages are finely worked, being embellished with gilding, painting, and mosaic work, and adorned with armorial bearings and allegorical figures. The larger number of these equipages are of London make, and came from the then famous carriage manufacturing firm of Buckindale. A four-seated

eight-windowed carriage, made by Gravelot, was bought in 1773, and is interesting as being the first equipage on springs introduced into Russia. Almost all the carriages just spoken of were thoroughly repaired in 1826, 1856, and 1883, and were used by their Majesties in the Coronation processions at Moscow. The earliest two-seated barouche, also to be seen in the museum, was brought over from England by Count Orlov as a present to the Empress Catherine the Second. It is on springs, open at the sides, and adorned with the finest woodwork, and the paintings executed by the well-known Bouchet. Some of the oldest and more fantastically finished sleighs, in addition to the usual ornaments in gilt woodwork and the armorial bearings, are also embellished with allegorical figures. These sleighs, which are for the most part of foreign make, London or Swedish, were much in use during the reign of Catherine the Second, for pleasure trips, or for drives to masquerades, balls et cetera. In the same reign a special Court Department was established at St. Petersburg under the name of the Work Yards, and at Moscow under the name of the Court Carriage Works, for which skilled hands were engaged. Later, the Work Yards were transformed into the Master Workmen Yards, and in which military workmen were employed.

It is not known when the first coachmakers appeared in Russia. The earliest manufacture of equipages was in the hands of saddlers, and were made piecemeal, the different parts being ordered from different workshops, as indeed at that time was the case in other European cities. These saddlers were thus accustomed to order the body of a carriage from a joiner, the iron work from a blacksmith, and the frame timber work, from a wheelwright; and having in this way obtained the raw materials, had them coloured by a painter, and they themselves only put them together. In a similar way, and from the earliest period, travelling coaches (*taran-tasses*) and other vehicles in ordinary use in the provinces of Russia were manufactured.

The first saddler in St. Petersburg who occupied himself with putting together the parts of more or less sumptuous equipages, was Ricquet, who became a member of a guild in 1775. His example was followed in 1776 by Froebelius, in 1778 by Tatsky, in 1779 by Werner, and in 1790 by Stafeev and Yakovlev. In the St. Petersburg museum are seen sleighs made by the saddlers Heyer and Tatsky, as well as by the special technicians of the Master Workmen Yards.

The earliest complete carriage factory, for carriages, barouches, and other town equipages, was established in St. Petersburg by the saddler Joachim, in 1792, to whom a large plot of ground near the Ismailov Bridge was granted by the Emperor Alexander the First, for the construction of a carriage factory. In this factory were prepared all the different parts of an equipage, from the body and iron works down to the colouring and lining of the vehicle. The equipages made in this factory served as models for the St. Petersburg saddlers and for the Moscow cartwrights, or makers of *teleigas*, who gradually began to make all kinds of town equipages on springs. Among the oldest of the Moscow firms may be reckoned those of Markov (1784), Miakoshev, and Illine.

In 1820, the Master Workmen Yards were closed, and in their place, according to a plan drawn up by the engineer Solomka, the Court Carriage Manufactory, with a military workshop, was established. At first, little more than repairs of equi-

pages were carried on in this establishment, and very few, if any, new equipages were made. All equipages for the Imperial Family were ordered from abroad, or made at the works of private carriage manufacturers, such as Joachim, Froebelius, and Tatsky. Droshkies and sleighs were made by Yakovlev. The manufacture of elegant town equipages in Russia was for a long time confined to reproductions after foreign models. For this reason, the Court and wealthy people preferred to order equipages from abroad, inasmuch as they were both better made and cheaper, and up to the commencement of the latter half of this century the import of equipages was very considerable. But about this time the manufacture of equipages in Russia began to make great progress. Owing to their admirable work, the excellence of the raw materials employed, and their comparative cheapness, those turned out by Russian firms were able to bear comparison with those of foreign construction. And when men with a special technical training began to occupy themselves with this industry, there were soon manifested praiseworthy efforts to turn out equipages that, in shape and form, should be well adapted to the local conditions of climate and roads. From this time, the manufacture became solidly established in Russia, and its rapid success was proved by its exhibits frequently receiving the highest prizes in different Russian and foreign exhibitions.

Carriage manufacture of every kind continued to develop more and more in Russia till the year 1855, in consequence of the constantly increasing demand for travelling and town equipages, and the already existing factories extended their operations, whilst new ones were being constantly founded. But with the introduction of railways this branch of industry visibly declined, and the demand for travelling vehicles, which had hitherto formed its principal item, almost entirely ceased. Further, the introduction of trams into the larger cities, and the erection of telephones, exercised a depressing influence on the equipage industry, and caused a considerable falling off in the manufacture, not only of public *droshkies*, but to a certain extent also of private equipages, and particularly of light *droshkies* and sleighs.

A great change was effected in the industry by the introduction into Russia, in the year 1877, of india-rubber tires. At first, these tires were sufficiently dear, but the comfort they secured by smoothness of traject and avoidance of all serious jolting, naturally caused a great demand for them, and consequently a proportionate cheapness in their production. The experience of many years has shown that india-rubber tires not only afford great comfort to those driving in a carriage furnished with them, but that the outlay incurred upon them is redeemed by the preservation from unnecessary wear and tear they afford to the equipage, and the security they ensure from serious joltings, from which an equipage must greatly suffer. Whilst a town equipage, well made, but with ordinary iron tires if in constant use on roads paved with cobstones, will last not more than ten to twelve years, and of course a poorly constructed equipage will last a much less time, an equipage furnished with india-rubber tires will, under the same circumstances, as has been proved, last above twenty years. This last circumstance naturally contributed to their more general use; and, at the present moment, in St. Petersburg, not only the larger number of private equipages, but also many of the public *droshkies* are provided with india-rubber tires. The extended use of these tires has borne heavily on first-class equipage factories, inasmuch as the sale of cheap

equipages of an inferior quality has, to their natural loss, increased, whilst repairing work has already decreased 20 per cent. On the other hand, the sale of india-rubber tires has considerably increased, and last year no less than 400,000 pouds of them were disposed of; but in proportion as their sale has augmented, the amount of carriage repairs has diminished, and is now scarcely one-half of what it was before, whilst in a similar way the demand for ready-made equipages has to a certain extent declined.

Ordinary india-rubber tires have one great disadvantage; namely, they scatter dirt over every object that happens to fall in their way; and this occurs not only in wet weather, but at every watering of the streets and roads. In consequence of numerous and constant complaints on this point, the propriety of forbidding the use of india-rubber tires in the city has more than once been mooted in the St. Petersburg Town Council. To avoid this inconvenience, all kinds of guards for the wheels have been proposed by different persons, but all such inventions have proved to be of no practical worth, partly by reason of their complicated clumsiness, and partly by reason of the costliness of the proposed apparatus, which moreover as experience has shown, do not attain the desired end. Mr. Jahn, an engineer, after having made numerous experiments, discovered about three years ago that by changing their shape, india-rubber tires can be prevented from throwing up and scattering dirt; and his invention, for which a patent has been taken out, has been proved to be thoroughly practical and completely successful. Towards the end of the year 1890, a committee was appointed by order of the Governor of the City, and after a public and detailed trial of the new tires, reported in favour of their expediency, and usefulness. Jahn's tires are made in the shape of the Roman letter V, and the rough edged side is turned towards the iron bandage of the wheel, like an ordinary india-rubber tire. When an equipage furnished with an ordinary smooth india-rubber tire is in motion, the tire falling between the stones with all its force, according to the weight of the vehicle and the rate at which it is going, will scatter the dirt about; but the Jahn tire, thanks to its rough edge, cannot get its socket bunged up with dirt, and even if any dirt falls into it, the dirt will be pushed aside with the rough edge of the tire and will thus remain in its place, the small quantity of splash falling under the carriage. The rough edge being, not in the middle of the tire, but on its outer side, any dirt attached to the wheel can be easily caught by splash-boards of a proper length, or, in the case of an equipage having no splash-boards, the same result can be obtained by constructing small shield-boards. Moreover, Jahn tires can be fixed to any wheel made for india-rubber tires of the ordinary smooth type, without any alteration. In spite of their novelty, they have for the foregoing reasons come to be generally used; and all the evil things prophesied of them, that they would easily burst, that they would quickly wear away, have, after two years experience, been proved to be perfectly groundless. Indeed, so far from being less durable, they are found to last longer than smooth india-rubber tires.

Of the other appliances of india-rubber in the construction of equipages, the use of india-rubber buffers in place of steel springs deserves to be noticed. This new invention is of great importance in places far removed from any town or railroad, where, in case of the spring breaking, it is extremely difficult to repair or to replace it. The swing of these buffers is sufficiently quiet and gentle; but, owing to

their fixture under the carriage being somewhat complicated, they have never come into general use. They have, however, been adopted by the War Department, and are used for military wagons, after the system of General Engelhardt.

Such then are the leading points in the past and present history of equipage industry in Russia. Proceeding now to notice the actual state of this industry, it must be confessed that in Russia it labours under far more unfavourable conditions than abroad. Of the subsidiary articles used in this business there are now manufactured in Russia with more or less success: axletrees, springs, lamps, screws, bands for india-rubber tires, and wheels. All the other necessary articles are manufactured in Russia, either not at all, or in a very unsatisfactory manner. The consequence is, each independent carriage manufactory must include every department of the industry. The best factories are obliged to order many materials from abroad, such as silk stuffs, rugs, shagreen et cetera. They must further lay in a sufficient stock of the materials, in order to allow their customers to have a good choice. A whole year's stock of dressed leather, skins, varnish, spring steel et cetera, and many years stock of the best sorts of wood, as oak, ash, hickory and mahogany, must moreover be laid in. Now, for all this a large capital is required, and in the meantime the fixed price for new equipages, when made of the best foreign materials, which are liable to heavy duties, does not even in St. Petersburg where hired labour is dear exceed, but on the contrary, is considerably lower than the Paris and London prices. And yet, the equipages turned out by the first-class Russian firms are not inferior in material, finish, or harmonious completeness, to those manufactured in London and Paris; and the same may be said of equipages manufactured in Warsaw, if they be compared with those made in Berlin and Vienna.

The types of town equipages in general use in Russia are not very varied in kind. Mail coaches, cabs, and American cars are not in use at all. Dogcarts, breaks, basket-phaetons, and similar summer equipages, are seldom to be met with. Parade or state carriages have all but gone out of use, since the Imperial Court, in accordance with the modest life it habitually leads, scarcely ever requires them. The lack of splendor and luxury in equipages proceeds in part from the fact that, till within a very recent period, there was no society for the protection and encouragement of the carriage industry. The society, established two years ago, has been limited to the granting of one annual prize for the best turn-out. There has of late been a demand on the part of different commercial firms for transport cars and wagons, and this has slightly relieved the otherwise generally prevailing stagnation in the carriage industry and trade.

The public conveyance branch of the industry, which plays such an important part in the manufacture of carriages, may be said to be in a satisfactory condition in many of the larger towns, such as Warsaw, Odessa, Riga, Tiflis, Baku, and others, as well as in the Crimea; but it must unfortunately be added, the same cannot be said of St. Petersburg, though some improvements have been made in the public *droshkies*, which in a fast approaching future are to be all provided with hood-covers.

It cannot be said that the import of foreign equipages is particularly great. During the last few years a considerable increase has been remarked in the importation of «equipages without springs, and equipages for children with springs», as may

be seen from the subjoined table of imports. But the reason of this apparent increase is to be found in the fact that in the tariff tables, velocipedes are included under this special rubric; for, as there is not a single manufactory in the whole of Russia, all velocipedes are brought from abroad. The exact amount of imported accessories used in carriage manufacture cannot be fixed with any certainty, since in the Russian tariff tables many different accessories are grouped under one particular rubric. Thus, under «railroad wares» are included axletrees, and springs. The official returns of such imports are therefore not sufficiently full, or detailed; but, as far as can be judged, their quantity cannot be very great. The amount of exports from Russia is also insignificant, as may be seen from the second of the tables immediately following.

IMPORT OF EQUIPAGES*.

Y E A R.	SPRING EQUIPAGES (LARGE).		SPRING EQUIPAGES (LIGHT).		Spring cars for the transport of pounds, also passenger cars with single back spring.		EQUIPAGES WITHOUT SPRING (ALL KINDS).		HAND SPRING EQUIPAGES FOR CHILDREN.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
1882. . . .	46	29,320	132	46,030	21	3,045	468	27,499	100	3,656
1883. . . .	37	28,150	138	51,105	17	2,100	565	32,842	155	5,296
1884. . . .	39	26,756	107	37,515	22	3,720	658	45,563	127	3,064
1885. . . .	26	25,050	60	23,901	13	2,765	651	66,508	68	3,155
1886. . . .	32	24,055	72	32,325	7	2,500	577	57,945	159	17,573
1887. . . .	11	6,850	34	14,050	11	2,930	410	53,510	87	8,847
1888. . . .	16	12,010	38	15,020	7	1,030	515	54,730	148	14,872
1889. . . .	37	25,830	48	18,165	8	2,250	1,429**	180,730	226	26,571
1890. . . .	31	24,350	64	28,635	18	5,430	2,259**	260,170	308	34,045
1891. . . .	39	22,468	87	32,851	66	11,870	5,259	614,092	—	***

The present yearly productiveness of all the Russian equipage factories cannot be given with any precision, and the official statistical returns are much below the reality, since all the village hand industries and handicrafts are free from Government control and registration. For this reason, the table given below of the home carriage manufacture, can have only a relative value, as showing the increase or decrease in the floating capital of those firms which give in annual returns, and which are reckoned among the largest and most extensive of Russian houses.

* This table is composed according to the «Survey of foreign trade of Russia», from 1877 to 1891.

** It must be remembered that under this rubric, as also for the two following years, velocipedes are included.

*** Transferred to the tariff for the year 1892, and included under one rubric with equipages without springs.

EXPORT OF EQUIPAGES AND VEHICLES *.

EXPORTED THROUGH THE EUROPEAN AND ASIATIC FRONTIERS, IN:	NUMBER OF EQUIPAGES.	VALUE OF EQUIPAGES IN ROUBLES.	NUMBER OF VEHICLES.	VALUE OF VEHICLES IN ROUBLES.
1882	1,004	57,329	(no returns).	—
1883	1,592	72,439	(no returns).	—
1884	480	89,325	(no returns).	—
1885	83	43,560	177	6,447
1886	—	19,320	139	7,780
1887	90	22,600	37	3,653
1888	235	29,575	53	3,985
1889	85	41,704	117	10,273
1890	201	86,960	350	18,745
1891	142	58,364	294	10,533

CARRIAGE MANUFACTURE IN RUSSIA FOR A PERIOD OF TEN YEARS **.

Y E A R S.	NUMBER OF MAN- UFACTORIES AND WORKS.	VALUE OF PROD- UCTS IN ROU- BLES.	NUMBER OF WORKMEN.
1881	148	2,154,000	2,885
1882	151	2,134,000	1,980
1883	160	2,381,000	2,963
1884	139	1,391,000	2,689
1885	129	1,946,000	2,688
1886 ***	131	1,850,000	2,528
1887	142	1,762,000	2,503
1888	137	2,059,000	2,842
1889	133	1,886,000	2,747
1890	130	1,914,000	2,626

* Table composed according to the «Survey of foreign trade in Russia», from 1882 to 1891.

** According to informations of the Department of Trade and Manufactures.

*** The returns for 1886 and 1887 include 5 factories in the Caucasus, with 28,000 roubles, and 1 in Siberia, with 1,000 roubles value of products. The return for 1888 includes 3 factories in the Caucasus with 62,000 roubles, and 2 in Siberia, with 12,000 roubles value of products. The return for 1889 includes 3 factories in the Caucasus, with 50,000 roubles, and 2 in Siberia, with 20,000 roubles value of goods.

Although there are no statistical data to judge of the extent of village hand industrial productiveness, it may be supposed, if the enormous extent of territory over which it is spread be taken into consideration, that its products, so far from being less than those of the large manufactories, will be greatly in excess of them. Indeed, without reckoning simple peasant vehicles, it may safely be estimated that the actual productiveness of the industry is twice the amount set forth in registered and official returns.

Besides the manufacture of shaft-bows, sleighs, wheels, et cetera which is spread over all Russia, there are districts where entire equipages are prepared by village hand industry. In the governments of Kazan, Viatka, and Perm, the equipage industry has flourished for a very long time, and vehicles, prepared exclusively by village *kustars* in these governments, find a ready sale throughout the eastern provinces of Russia. This village hand industry, under favourable circumstances, forms the basis of the actual professional and commercial activity of the Empire; and, in general, it secures to its customers excessively cheap, if sometimes rude and unfinished products. Thus for example, in the Novgorod government, a pair of wheels, with poplar wood fellies, is sold for 1 rouble 50 kopecks; in the Poltava government, where timber is much dearer, wheels made of the best wood that grows there, are sold in the centres of village hand industry from 3 roubles 50 kopecks to 7 roubles a set, and at 8 roubles 50 kopecks, if made to order; whilst a *brietchka* costs from 45 to 80 roubles. In the village Industrial Museum, lately opened at St. Petersburg, prevail the following fixed prices: 5 roubles for a set of wheels, made in the Medynsk district of the Kalouga government; 6 roubles for a set of *tarantass* axletrees, made in the Yaroslav government; 1 rouble 20 kopecks for four wrought-iron screw nuts; 60 kopecks for four screw nuts for light racing *droshkies*; 6 roubles 50 kopecks for a set of axletrees for *droshkies*, with horn plates and axle screw-nuts. The prices for other products are proportionately low.

The village hand industry is most widely developed in the Moscow government, which is to be explained by the easy sale of its products, and by the large orders given by manufacturers. For this reason, in Moscow, where village industrial labour can be commanded, the price of an equipage is from 10 to 20 per cent cheaper than in St. Petersburg. In general, owing to its central position, Moscow occupies the first and chief place in carriage manufacture. On the contrary, in St. Petersburg, owing to its unfavourable position, the outcome of the carriage industry is much less, though its products are far more varied in character and kind. After St. Petersburg follow in order Warsaw, Odessa, Riga, Kiev, and a few other cities. The official returns for 1888 to 1889, which are unfortunately confined to the larger factories, give 27 factories for Moscow, with an annual output to the value of 800,000 roubles; whilst for St. Petersburg they give only 6 factories, with an annual output of products to the value of 500,000 roubles. But, in fact, these figures are put considerably too low for both these two cities.



CHAPTER XXIII.

Review of the Russian Customs Tariff Systems.

IN the beginning of the present century, the customs tariff system underwent in Russia frequent fluctuations, chiefly under the influence of political considerations. In 1800, the protective and high tariff duty system, introduced towards the end of the eighteenth century, was enforced by the prohibition to import silk, cotton, flax, or hemp materials, glass, earthenware, or porcelain. In the earlier months of the year 1801, with a view of counteracting the development of English trade by sea, it was forbidden to export all Russian wares in general; but this decree was soon after rescinded upon the accession to the throne of Alexander the First. In 1804 the importation of English manufactured goods was forbidden. In 1810, Trade Statutes were issued with the object of restricting as far as possible the importation of foreign goods into Russia, and forbidding the import of nearly all ready-made articles, but at the same time facilitating the importations of goods on neutral vessels. With the restoration of peace in Europe, certain concessions were first made in the new customs tariff for 1816, and later the protective system was completely abandoned by the application to the whole Empire, and to the Kingdom of Poland, of the tariff of 1819 which permitted the import on reduced duties of goods that had formerly been altogether forbidden. This sudden adoption of a system that gave great freedom in the importation of foreign goods, acted very unfavourably on the manufacturing trade of Russia. At the same time, it became evident that foreign governments, in spite of all that had been said at the Vienna Congress, did not intend to introduce into their countries the system of free trade, which might have favoured the export commerce of Russia. On the contrary, a new tariff of a decidedly protective character was introduced into France, together with the establishment of the notorious sliding scale of import duties on corn. Prussia also raised the duties on all imported dry materials.

In view of all these circumstances, Russia acknowledged the necessity of changing her tariff policy, and returning to the protective system. In the year 1822, a new customs tariff was drawn up, in accordance with which many foreign goods were either forbidden to be imported, or subjected to very high customs duties.

From that date the tariff system has been more constant in its general tendency, and the changes made in it from time to time have been both gradual and consequent. The history of the Russian customs tariff may be divided, from the year 1822, into three periods: First, from 1822 to 1849, which period is characterized by a consistent maintenance of strictly protective principles, with the gradual substitution of a virtual prohibition of the importation of foreign goods by the imposition of very high duties; second, from 1850 to 1876, during which period a system of moderate protection was adopted, and finally confirmed by the tariff of 1868; third, from 1877 to 1893, in the course of which period the principle of protecting home productions and home industry has been consolidated by a series of measures, and eventually confirmed in all branches of industry by the tariff of 1891, which is still actually in force. It must, however, be borne in mind that these periods cannot be sharply fixed or divided from one another. The principles prevailing in each period were only very gradually replaced by the principles governing the tariff of the next succeeding period.

FIRST PERIOD, 1822 TO 1849.

The tariff of 1822, with which this period opens, was preeminently a protective one. Amongst other products, it altogether forbade the importation of textile fabrics (except batiste and cambric kerchiefs), cotton stuffs, except a few of the simpler kinds, different sorts of cloths, most silk stuffs, writing and typographical paper, copper wares, glass and porcelain goods, the better sorts of earthen wares, and refined sugar. The import of cast-iron and iron by sea was forbidden; and a duty of 90 kopecks per poud was levied on cast iron, and 1 rouble 20 kopecks per poud on assorted iron, if imported by land. The strictly protective tendency of this tariff in all that related to home productions was not modified by the changes introduced into it by Count Kankrin. These changes, which were made with the view of increasing the customs revenue, mainly consisted in substituting for strict prohibitions the imposition of high duties, in raising the duty on imported goods with the aim of equalizing the duties imposed with the value of the goods taxed, and with their brisker or slower sale; and lastly, in reducing the duty on exported goods. Thus, in 1824, the duty on cotton yarn, unboiled sugar, spices, liquors, tobacco, and wrought metals, was raised. In 1825, the duty on silk stuffs was increased, and for the first time a duty was imposed on yarn dyed Turkey-red. In 1826, the prohibition laid by the tariff of 1822 was taken off different articles, and, among other goods, the importation under a high duty was permitted of mixed cotton stuffs, except printed, dyed, streaked, or embroidered cottons, linen kerchiefs, except printed and dyed ones, the finer sorts of silk stuffs, hats, and walking-sticks. It is interesting to notice that, with the view of encouraging sheep breeding in Russia, sheep shears were allowed to be imported free of duty. In 1830, further changes were made, and articles previously prohibited were now permitted to enter Russia «for the sake of quickening the home trade and affording models for home manufacturers.» Towards the end of 1831, the duty on the more valuable sorts of wood used in joinery and carpentry, on indigo and other dyeing materials, on spices, oil, wine, et cetera, was raised. Independently of this, it was decreed that a supplementary

duty, in proportion to $12\frac{1}{2}$ per cent of the duty actually imposed, should be levied on all imported goods of every kind. As the increase in duties made by this decree had solely in view the augmentation of the custom revenues, rather than the encouragement of home manufactures and products, it was found possible, in 1836, when the financial position of the country had improved, to lower the proportion of the supplementary duty. According to the tariff table for 1836, the duty on all materials employed in handiwork, and also on certain ready-made goods, was diminished in the proportion from 10 to 12 per cent. At the same time, some articles were freed from the prohibition hitherto placed on them. The further changes introduced into the tariff of 1838 were made in the same direction. The export duty was suppressed on naphtha, hare skins, dressed hides and flaxen tissues, iron, smithcraft products, and wool; whilst the duty was lowered on exported hops, corn, cattle, and potash. In 1841, the partial changes introduced into the tariff by Count Kankrin, Minister of Finance, were fully carried out by the issue of a new customs tariff, which was confirmed by the Emperor, November 28, 1841, and came into force, on and after January 1, 1842. The principal changes introduced by this tariff consisted in the removal of many prohibitions, the only articles, the importation of which continued to be forbidden, being the following: albums, chemical drugs, gold embroidery, gold-woven and galloon work, linen, ready made clothes, coffee substitutes, printed stuffs, and a few other unimportant articles. In all its clauses, the supplementary duty of 1831 was included in the general assessment, and a round duty was fixed, with an increase in most cases of 30 per cent, on drugs, gloves, optical glasses, assorted lead, wire strings, et cetera. The duty on cocoa, spices, the finer sorts of fur, was lowered. Cooper wares and products, as well as agricultural machines, were allowed to be imported free of duty.

The following table is intended to show the state of foreign trade and commerce during the period above mentioned:

Y E A R S.	EXPORT.	IMPORT.	EXCESS OF EX- PORT (+) OR IMPORT (--).	CUSTOMS REVENUES.
	R o u b l e s.			
1824	50,300,000	42,100,000	+ 8,200,000	11,100,000
1825	59,800,000	44,100,000	+ 15,700,000	12,700,000
1826	44,600,000	73,800,000	— 29,200,000	12,300,000
1827	56,600,000	46,100,000	+ 10,500,000	13,800,000
1828	50,200,000	47,300,000	+ 2,900,000	14,900,000
1829	56,500,000	53,100,000	+ 3,400,000	16,000,000
1830	63,500,000	43,900,000	+ 19,600,000	17,200,000
1831	61,400,000	41,900,000	+ 19,500,000	18,200,000
1832	61,600,000	43,900,000	+ 17,700,000	23,300,000

Y E A R S.	EXPORT.	IMPORT.	EXCESS OF EX- PORT (+) OR IMPORT (—).	CUSTOMS REVENUES.
	R o u b l e s.			
1833	59,000,000	45,000,000	+ 14,000,000	23,400,000
1834	55,400,000	53,300,000	+ 2,100,000	23,000,000
1835	54,100,000	54,200,000	— 0,100,000	22,400,000
1836	69,400,000	56,600,000	+ 12,800,000	23,300,000
1837	63,800,000	60,400,000	+ 3,400,000	25,600,000
1838	77,900,000	59,600,000	+ 18,300,000	24,900,000
1839	86,400,000	59,600,000	+ 26,800,000	25,500,000
1840	76,600,000	67,300,000	+ 9,300,000	26,400,000
1841	76,900,000	65,200,000	+ 11,700,000	26,600,000
1842	74,100,000	69,900,000	+ 4,200,000	29,900,000
1843	73,200,000	62,600,000	+ 10,600,000	29,500,000
1844	82,500,000	65,800,000	+ 16,700,000	31,900,000
1845	81,100,000	68,500,000	+ 12,600,000	30,400,000
1846	90,700,000	71,700,000	+ 19,000,000	30,300,000
1847	* 136,900,000	74,000,000	+ 62,900,000	29,100,000
1848	78,500,000	76,800,000	+ 1,700,000	29,600,000
1849	85,700,000	81,900,000	+ 3,800,000	29,900,000

It appears from these returns that in the twenties the average amount of exports may be valued at 53,000,000 roubles, exceeding by 2,000,000 the value of the average annual imports (51,000,000 roubles), the customs duty forming 27 per cent of the import value. In the thirties the average yearly export reached 65,000,000 roubles, exceeding the mean yearly import by 13,000,000 roubles, the customs duties forming 45 per cent of the import value. Finally, in the forties, the average yearly export, excluding the abnormal year, 1847, grew to the sum of 80,000,000 roubles, or 10,000,000 roubles more than the amount of the mean import, of which the duties collected were about 30 per cent.

* The great increase in the exports for the year 1847 is to be explained by the extraordinary demand for Russian grain that year, in consequence of the complete failure of the crops in many of the countries of Western Europe. Thus, 5,954,000 chetverts of wheat were exported instead of 3,183,000 chetverts as in 1846, and 2,789,000 chetverts as in 1845; 2,700,000 chetverts of rye, instead of 1,709,000 chetverts as in 1846, and 244,000 chetverts as in 1845; and 5,863,000 roubles worth of rye flour, instead of 928,000 roubles worth, as in 1846, and 787,000 roubles worth, as in 1845. In all, the grain and flour exports amounted in value to 71,280,000 roubles, instead of 28,929,000 roubles, as in 1846, and 16,573,000 roubles as in 1845.

For the period reviewed there are no systematic data relating to the growth of the manufacturing industry in Russia, which in many branches is mainly developed as a household trade, not easily registered. However, as far as may be seen from the occasional data upon the subject, it may be inferred that, owing to the influence of the protective tariff together with other measures furthering the home production, the Russian manufacturing industry developed greatly. Thus, in 1825 there were 484 cotton factories, employing 47,000 hands, and in 1850 their number was 536, with 110,000 workmen. In the beginning of the twenties cotton factories were almost exclusively made of imported yarn, to the value of 8,640,000 roubles, and cotton tissues, to 2,000,000 roubles; at the end of the forties the cotton spinning industry was already firmly established in Russia; in 1847 to 1849 the mean import of raw cotton was 1,200,000 pouds, that of yarn being only to the value of 4,400,000 and of tissues to 1,150,000 roubles. Of cloth factories, 324 existed in 1825, with 64,000 workmen, and in 1850, already 633 such works were reckoned, employing 98,000 hands. The number of silk-weaving establishments amounted in 1825 to 184, with 10,000 workmen, and to 384 in 1850 with 17,000 hands employed. At the 87 paper mills, in existence in 1825, 8,000 men were engaged in the work; in 1850 the number of factories increased to 159, and that of hands to 15,000.

SECOND PERIOD, 1850 TO 1876.

The gradual change of the prohibitory system of the customs tariff for a protective policy began soon after Count Kankrin left the post of Minister of Finance. An Imperial ukase, of April 17, 1845, abolished the prohibition of the import of printed silk wares, trinkets, bronze and marble articles, watches, albums et cetera; in the mean time a free export was established for oil seeds, tea brought through Kiachta as a transit ware, and rope. On June 1, 1846, the Emperor sanctioned the opinion of the State Council, by which the export taxes on tallow, hemp, flax, and bone in lumps, were removed, while the duties levied on imported chemical products, faïence crockery, black and green cloth, highest sorts of lace, ostrich feathers, pomatum, coffee, spices, and some other foodstuffs were lowered, and the import of wares of platina permitted. The tariff of 1850 did still more in this direction.

The working out of this tariff began already at the end of the forties, the well-known economist Tengoborsky taking a part in it; and the following questions were considered: 1. the simplification of the tariff clauses; 2. the improvement in the classification of the wares, and the placing of duties more conformable to the value of the articles subjected to it; 3. the furthering of the home production by the competition with foreign goods, as well as by the lowering of taxes levied on different half-finished wares, and on the principal raw materials used in manufacture, such as chemical products and dyes; 4. the abolishing of such prohibition as was not absolutely necessary; 5. the lowering of certain of the duties which exceeded the degree, needed for the protection of the home industry, and could thereby injure the regular trade, and be prejudicial to the State revenues by encouraging smuggling; 6. to help the consumers, and further the development of the external trade by increasing the

number of the articles for exchange; 7. to open new sources of revenues to the State Treasury, by allowing the import of such articles as were until then prohibited; and in general, to prepare the transition to the system of moderate protection.

Independent of that, one of the most important problems to solve was the composition of a general tariff for the Empire and Poland, as in 1822 the custom's line separating them was abolished. The greatest difficulty consisted in the difference of the tariffs, as according to that, until then existing in Poland, much smaller duties were levied, especially on foodstuffs and raw and half-wrought materials needed in the manufacturing industry.

The prohibitory tariff of 1822 had not been extended to Poland in which with some changes the moderate tariff of 1819 was still in force. The trade between Russia and the vice-royalty of Warsaw was carried on according to the law of August 1, 1822, and the statute of June 30, 1824, concerning the transport of the local wares from the Empire into Poland, and vice versa. These regulations were as follows: 1. All raw materials worked in both parts of the State were allowed to be transported from one to the other free of all duty; 2. an import tax of 1 per cent ad valorem was levied in both countries on the articles worked from their respective raw materials, and brought from one to the other; 3. for wares produced of foreign materials in Russian or Polish factories, a duty of 3 per cent ad valorem had to be paid; an exception was made of cotton yarn and cotton tissues, and refined sugar when brought from the Empire into Poland; a tax amounting to 15 per cent of the value for cotton goods, and one of 25 per cent for sugar, being imposed in that case.

The above mentioned bases of the counterchange of wares tending to the advantage of Poland's industry, especially to that of wool, reacted on the trade balance of both countries; thus, during the period from 1825 to 1829, the yearly import from Poland to the Empire averaged 7,827,000 roubles, including finished wares for 6,937,000 roubles (of which 6,768,000 roubles fell to cloth goods), and foodstuffs and materials for 684,000 roubles; the average yearly export from the Empire into Poland was only 6,136,000 roubles, out of which 1,927,000 fell to ready articles, and 2,501,000 roubles to raw materials and foodstuffs.

Y E A R S.	EXPORT FROM THE EMPIRE INTO PO- LAND.	IMPORT FROM PO- LAND TO THE EMPIRE.
	T h o u s a n d s o f r o u b l e s .	
1843.	1,981	1,162
1844.	1,994	1,042
1845.	2,295	1,094
1846.	2,340	1,316
1847.	2,835	1,608
Average yearly.	2,123	1,244

After the subdual of Poland a new tariff for the trade between it and the Empire was published, November 13, 1834), which lessened to some extent the advantages of the trade of the Kingdom, by placing higher duties on the wares brought therefrom to the Empire; for instance, a tax of 15 per cent ad valorem was placed on woollen goods. At the end of the period reviewed the trade balance changes to the profit of the Empire, the export from it to Poland exceeding the import of the Polish goods into the Empire, as seen from the table on the preceding page.

The import from Poland consisted as before of finished wares, and the export from the Empire, of foodstuffs and raw materials.

YEARS.	EXPORT FROM THE EMPIRE.		IMPORT FROM POLAND.	
	In thousands of roubles.			
	Foodstuffs and raw materials.	Finished wares.	Foodstuffs and raw materials.	Finished wares.
1843	978	174	473	689
1844	862	143	372	670
1845	1,284	108	421	672
1846	1,392	133	468	848
1847	1,750	116	701	906
Average yearly . .	1,253 *	135	487	757

As the introduction of the high Russian tariff into Poland was likely to be followed by a shock in the local manufacturing industry, and by a surcharge of the consumers; and as, on the other hand, the spreading of the moderate Polish tariff over the Empire threatened to lessen the customs revenues, to uphold the interests of both sides differential duties had been allowed in the tariff of 1850, namely, higher duties on wares imported by sea, which generally supplied the Empire, and lower duties on goods imported by land, as forming the chief supply of the Kingdom. The new tariff, founded on the above-mentioned bases, for the Empire as well as for Poland, was introduced January 1, 1851. In it the clauses were simplified, and their number diminished from 1,176 to 442; out of 89 prohibitory clauses 76 were abolished, and duties on 725 clauses were lowered, which according to the import value of the preceding years amounted to the sum of 1,435,000 roubles.

The next general change in the tariff duties was made in 1854, called forth by the stand-still of the external trade by sea, and the concentration thereof on the western frontier during the Crimean war. In order to help the land trade, and to keep Russia from a probable trade crisis, it was reckoned necessary to lower the duties on almost all of the wares imported across the above frontier. At the end of the war a new revision of the tariff had been undertaken, with the aim of changing the exclusive measures introduced during the time when the Russian ports were

* The remainder of the export consisted of animals.

blockaded by the enemies, as well as to promote further accordance of the customs systems with a moderately protective policy. The changes made were founded on the following considerations. Although the duties on some goods were lowered in 1850 by a quarter to one-half of the former, however in many cases it proved insufficient for the desired furthering of the external trade and the lessening of smuggling, because: 1. the former was so high that the duties often exceeded to a considerable extent the price of the wares; 2. the prices of some goods had declined to such a degree from the time of introduction of the former tariffs that the duties, which in the twenties formed from 30 to 40 per cent, in the forties amounted from 80 to 100 per cent ad valorem. Thus, according to the tariff of 1850, too high duties were placed on some of the wares, encouraging thereby smuggling to the detriment of the customs revenues and regular trade, without helping in any way the home manufactures. This fact showed the necessity of lowering some of them. Besides, the great difference established between the duties on goods brought by sea and on those by land had also to be diminished, as after the raising of the blockade it called forth an increase in the import of goods by land, to the disadvantage of the marine trade. Finally, although changes had been made in the tariff of 1850 with a view to simplification, disagreements however often arose between the merchants and the customhouses, as different duties were levied on wares, the quality of which was in the main similar.

The new tariff was ratified by the Emperor on March 25, 1857, and set in force from the day when it was received by the customhouses. In this tariff the classification of goods imported was once more simplified, and the number of paragraphs diminished from 442 to 368, not counting the special list of apothecary wares; of the 19 articles formerly prohibited, 7 were allowed to be imported, and on 299 articles the duties were lowered, on the whole by 1,900,000 roubles, as compared to the customs revenues of 1851 to 1854.

According to the principles taken already as a basis for the tariff of 1850 with the view of a gradual transition from the prohibitory system to that of a protective policy by the schedule of 1857, comparatively high duties were placed on goods in more general use, in order to protect such branches of home industry as employed the greatest number of hands, and supplied the wants of the bulk of the consumers; more moderate duties were levied on such articles as did not afford any danger of competition. In the mean time the duties on materials used at the factories and trade establishments were lowered, as well as those on some of the food-stuffs, such as wine, coffee, spices, fruit, and the like, with the view of increasing the customs revenues. Besides this, according to the tariff of 1857, the duties levied on goods imported across the land frontier were made equal to those on goods brought by sea, in order to enliven the Russian sea trade. However, the smaller rates were preserved for some articles, imported across the land frontier, partly in order to help the local inhabitants in the acquisition of such wares as would be too expensive if brought from the ports or the interior government, partly in order to limit the development of the smuggling trade, as the extensive frontier line afforded great facility therefor.

The next general revising of the tariff, on the course of the change of the patronizing system to that of a moderately protective policy, refers to 1867, although

in 1857 there were already made important alterations in the same direction. According to the opinion of the Council of State, sanctioned by the Emperor on June 19, 1859, duties were lowered on cast-iron to 5 kopecks per poud; on bar iron, to 35 kopecks per poud; on assorted iron, to 45 kopecks per poud; and on sheet iron, to 70 kopecks per poud. According to the State Council's opinion, sanctioned by the Emperor, May 8, 1861, machine-building factories were allowed to import iron and pig iron free of duty. In 1865 the taxes on many goods were lowered, and the list of articles, allowed to be imported duty free, was enlarged. On March 30, 1861, the opinion of the State's Council allowing the import of the Kiachta teas across the European frontier was sanctioned by the Emperor. This import was until then prohibited by the tariff of 1822, the measure calling forth the smuggling trade on the western frontier, which developed still more when, according to the treaty of 1843, five Chinese ports were opened to the European trade. The abolishing of this prohibition in 1861 had in view the lessening of the quantity of smuggled tea, with which aim a series of other measures was equally introduced; together with the permission of the import of teas from Canton, the duty on Kiachta teas was lowered. Regardless of the changes made in the tariff of 1857, the duties were twice raised by 5 per cent on the whole, except those levied on sugar, with a view to increase the fisc, namely in 1859 and 1861.

Finally, during the same period a very important order concerning the export trade was issued; according to the opinion of the Council of State, ratified May 18, 1864, all the customs duties levied on goods exported from the Empire and from Poland were abolished, with the exception of those on lumber, potash, mats, resin, leeches, rags, and bone; by the tariff of 1867 the export taxes on lumber, mats, tar, and all kinds of tree bark, were abolished. *

The tariffs of 1850 and 1857 did not call forth any visible increase in the customs revenues; in order to secure such an aim, as well as to facilitate the regular trade, a new revision of the tariff was instituted in 1867, the chief principles considered being: 1. the instalment of duties more proportionate to the value of the goods, with a view of limiting the smuggling trade; 2. the simplifying of the classification used in the tariffs, and the introduction of auxiliary duties of 5 per cent, in order to simplify the customs book-keeping, these duties being not levied on articles already highly taxed; 3. the equalizing of the duties on the goods imported by sea and by land, as owing to the uniting of the Empire to Western Europe by railways, no need remained for retaining the smaller dues on those imported across the land frontier, as they served only to concentrate the import trade at the land frontier to the prejudice of the Russian ports, thus increasing the number of ships coming with ballast, and the amount of the freights, and injuring thereby the export trade; 4. the diminishing of the duties levied on raw materials, inasmuch as the condition of the State Treasury could afford it.

The new customs tariff, ratified by the Emperor, June 3, 1868, was put in force January 1, 1869. According to this schedule: *a.* the number of articles comprised in

* According to the tariff of 1857 many export duties had been kept; for example, those on leather, bristles, horse tails and manes, rye, oats, maize, barley, wheat, flax, hemp, copper, isinglass, et cetera.

the lists of goods imported, exported, and prohibited, as well as in that of apothecary materials, was diminished from 719 to 260; *b.* 16 classes were permitted to be imported duty free; *c.* the taxes on 152 articles were lowered by an average sum of 1,500,000 roubles, as compared to the customs duties of 1865 to 1866; *d.* for 35 articles taxes were increased by 260,000 roubles.

The following comparative figures will show the dimensions of the customs duties for the period 1850 to 1876. They refer to the principal articles of import according to the tariffs of 1841, 1857, and 1868.

G O O D S.	DUTIES LEVIED ACCORDING TO THE TARIFFS OF :		
	1841.	1857	1868.
	R o u b l e s.		
FOODSTUFFS:			
Coffee, per poud.	6.10	{ 2.50 by sea 2.35 by land.	1.50
Tea, » »	prohibited.	prohibited.	{ 15.40 black and brick tea. 22.00 flower and green tea.
Raw sugar, per poud . .	3.80	{ 3.0 by sea 2.0 by land.	{ 3.00 by sea 2.50 by land.
Refined » » » . .	prohibited.	{ 5.0 by sea 4.0 by land.	{ 4.50 by sea. 4.00 by land.
Cured herrings, per poud.	0.10, 0.15, 0.4, according to the sort.	0.10 and 0.20.	0.10
RAW AND HALF-MANU- FACTURED GOODS :			
Tobacco in leaves, per poud	6.00 to 12.00	6.00	4.40
Tanned leather » »	40.00	{ 10.00 by sea 4.00 by land.	8.00 to 4.40 de- pendent on quality.
Flax yarn, per poud . .	4.80	3.00	4.00
Wool unspun, per poud .	1.90	0.20	0.22
Woollen yarn » » .	{ 4.00, not dyed 8.00 dyed	{ 4.00	{ 4.40
Cotton, per poud	0.25	0.25	duty free.
Cotton yarn not dyed, per poud	6.50	3.50	3.25
Cotton yarn dyed, per poud	8.00	{	{
Cotton yarn dyed Adriano- pol red per poud. . .	15.20	{ 5.00	{ 4.25
Pig iron, per poud . . .	{ prohobited by sea 1.03 by land.	{ 0.15	{ 0.05
Bar and assorted iron, per poud	{ prohibited by sea 1.38 by land,	{ 0.30 to 0.70 by sea 0.30 by land.	{ 0.35

W A R E S.	DUTIES LEVIED ACCORDING TO THE TARIFFS OF:		
	1841.	1857.	1868.
	R o u b l e s.		
Sheet iron, per poud. . .	3.60	{ 0.90 by sea 0.60 by land.	{ 0.50
Zinc » » . . .	1.20	0.50	0.30
Turpentine » » . . .	8.00	0.30	0.30
Indigo » » . . .	13.50	{ 3.50 by sea 2.50 by land.	{ 3.00
Ultramarine, per poud. .	300.00	2.00	2.00
White lead » » . . .	1.50	0.40	0.50
Verdigris, per poud . . .	6.00	2.00	—
Dye extracts, per poud .	5.80	{ 1.60 by sea 1.20 by land.	{ 2.50 1.50
Ammonia combinations, per poud	1.20 to 2.85	0.20 to 1.00	0.20
Sodium, per poud. . . .	{ 0.30 unrefined 1.50 refined.	0.10 all kinds.	{ 0.10; 0.20; 0.30 dependent on quality
Potash » »	0.30	0.05	duty free.
Vitriol » »	1.90	0.70	0.20
Glue » »	1.20	0.00	0.10
FINISHED WARES:			
Pottery, per poud. . . .	4.65	{ 0.40 by sea 0.20 by land.	{ 0.29} dependent 1.00} on quality.
Faïence » »	4.65 to 12.00	{ 1.60 to 4.00 by sea 0.60 to 3.00 by land.	{ 0.75; 1.00; 2.50 dependent on quality
Porcelain, per poud. . .	prohibited.	{ 6.00; 12.00; 24.00 by sea 5.00; 11.00; 23.00 by land	{ 4.00; 8.00; 16.00; dependent on quality
Window glass, simple glass wares, per poud.	18.00	{ 2.00 by sea 1.00 by land.	{ 1.10
Simple brass wares, per poud	6.90	—	3.00
Cast-iron wares, per poud.	{ prohibited by sea 1.38 by land.	{ 0.80 by sea 0.50 by land.	{ 0.50
Iron wares » » . . .	3.60	1.00	1.00
Lead wares » » . . .	12.00	1.20	0.80
Implements and tools, per poud	1.50	{ 0.80 by sea 0.50 by land.	{ 0.80 by sea 0.50 by land.
Machinery, per poud . .	duty free.	duty free.	{ partly duty free party 0.30
Cutlery, per pound . . .	1.20	0.40	0.40
Cables and rope per poud.	1.60	0.40	0.40
Fishing nets » » . . .	12.00	2.00	0.40

W A R E S.	DUTIES LEVIED ACCORDING TO THE TARIFFS OF:		
	1841.	1857.	1868.
	R o u b l e s.		
Linen cloth per pound. .	1.85 and 5.60 de- pendent on quality.	{ 25 per cent of the value, by sea. 20 per cent of the value, by land. }	30 per cent.
Twilled stuffs, per pound.	2.30	{ 0.70 by sea 0.65 by land. }	0.65
Twilled woollen goods, per pound.	1.20 to 3.50 ac- cording to quality.	0.70 to 1.40 ac- cording to quality.	0.40, 0.50 and 1.20 according to quality.
Untwilled woollen goods, per pound.	1.20 to 3.50 ac- cording to quality.	0.60 by sea 0.50 by land.	0.50, 0.85 and 1.10 according to quality.
Printed woollen goods, per pound.	prohibited.	by sea 0.80 to 1.60 by land 0.79 to 1.60	0.65, 1.10 ¹ / ₂ and 1.43 according to quality.
Lace, per pound	12.00 and 22.50	4.00	3.00
Linen clothing	prohibited.	35 per cent.	35 per cent of the value.
Simple soap, per poud. .	5.00	1.50	1.00
COTTON FABRICS:			
Not transparent, per pound	0.83 to 3.50 de- pendent on quality.	{ solid 0.30 by sea 0.35 by land. }	0.28 to 1.10 ac- cording to quality.
Transparent, per pound .	2.75 to 7.20	light 1.00	

The average turnover of the foreign trade and the customs duties thereof, during the period when the tariffs of 1850, 1857 and 1868 were in force, are seen from the following table.

Y E A R S.	EXPORT.	IMPORT.	EXCESS OF EX- PORT (+) AND OF IMPORT (-).	CUSTOMS DUTIES.
I n m i l l i o n s o f r o u b l e s.				
1850	85.4	77.4	+ 8 (10 per cent)	30
1851 to 1856 *.	98.2	79.2	+ 19 (24 » »)	31
6				
1857 to 1868	168	155	+ 13 (8 » »)	33
12				
1869 to 1876	314	399	— 55	51
8				

* If the war years be excluded the average yearly export = 132 million roubles; the average import = 91 million roubles; that is, the export exceeded the import by 41 million roubles, or 75 per cent; the average customs duties = 37 million roubles.

These data show that the leaving off of the patronizing system was followed by a gradual alteration in the balance of the foreign trade, not to the advantage of Russia; when the tariff of 1850 was in force the export exceeded the import, on the average, by 19 million roubles, or 24 per cent yearly, and if the abnormal years of the Crimean war be excluded, by 41 million roubles, or 45 per cent yearly; under the influence of the tariff of 1857 the excess of the export falls to 8 per cent, averaging about 13 million roubles yearly; and if the period of the cotton crisis and the years immediately succeeding to the abolishment of the obligatory labour be excluded, to 7 per cent; since the tariff of 1868 has been set in force, the import begins to exceed the export on an average by 55 million roubles yearly, or by 16 per cent.

The growth of the development of the principal branches of the Russian manufacturing industry during the tariffs of 1850, 1857, and 1868, can be seen from the following table, in which the average yearly fluctuations in the growth of these branches are given in per cents.

MANUFACTURES.	TOTAL VALUE OF THE YEARLY PRODUCTION.				AVERAGE YEARLY IN- CREASE (+), OR DE- CREASE (—) OF THE PRODUCTION.		
	1850.	1857.	1867.	1876.	During the tariffs of:		
					1850.	1857.	1868.
	Millions of roubles.				Per cents.		
1. Cotton spinning	15.9	18.5	40.4	66.4	+2.6	+ 7.4 *	+5.7
2. Cotton weaving.	12.8	15.6	30.1	36.3	+3.4	+ 6.2 *	—2.1
3. Wool spinning	—	0.4	2.6	2.5	—	+18.5	—0.4
4. Cloth	18.2	26.0	34.0	40.2	+6.1	+ 2.5 *	+1.9
5. Other woollen and half-woollen tissues	6.9	6.7	12.6	16.1	—0.5	+ 7.1 *	+2.8
6. Printing, dyeing, and finishing of the fabrics	16.3	16.5	32.1	37.7	+0.2	+ 6.2	+1.8
7. Silk weaving	6.4	5.3	4.3	8.2	—3.2	+ 1.9	—7.4
8. Hemp spinning, and rope . .	2.2	3.3	4.2	4.0	+7.0	+ 2.4	—0.5
9. Paper.	3.2	3.6	4.9	9.1	+2.0	+ 2.8	+7.1
10. Leather	8.6	10.0	16.1	26.6	+2.6	+ 4.4	+5.7
11. Chemical products and dyes .	2.2	3.9	5.0	5.5	+10.0	+ 2.2	+1.1
12. Soap, and tallow candles . .	4.0	5.6	6.8	9.1	+5.8	+ 1.8	+3.3
13. Glass	3.0	3.4	3.5	5.2	+2.1	+ 0.3	+4.5
14. Building of machines and railway cars; mechanical industry.	0.4	3.9	14.0	43.4	+5.8	+ 1.8	+3.3

* With regard to the cotton and wool manufacture, in which the obligatory labour had a vast application, the period during which the tariff of 1857 was in force can be divi-

This table shows that during the period when the tariff of 1868 was in force, the growth of almost all the important branches of the Russian manufacturing industry was a great deal slower than during the period of the tariff of 1857, notwithstanding the fact that the emancipation of the serfs, followed by a short period of retarding in the manufacturing industry, served as an active factor in the development of all its branches. Thus, the increase of cotton spinning fell from 17 per cent, which it reached in the last years of the activity of the tariff of 1857, to 6 per cent in the period from 1868; that of cotton weaving, from 24 per cent to 2 per cent; that of chemical products and dyes, from 2.4 per cent to 1.1 per cent; that of wool weaving, from 19 to 3 per cent; of printing and finishing of the fabrics, from 11 to 2 per cent. The production of such branches of the industry only increased as were put under favourable conditions by the schedule of 1868, facilitating the import of raw and half-manufactured goods used by them; for example, the leather industry, machine building, and mechanical works.

THIRD PERIOD, 1877 TO 1891.

The above-mentioned facts, namely, the change in the trade balance to the discredit of Russia, and the unequal and even somewhat slackened development of the manufactures, together with some financial considerations of prime importance, induced the Government to return in the second half of the seventies to the system of protection.

The first measure taken was an order, issued January 1, 1877, to levy the duties in gold without diminishing face figures, on account of the low exchange of the paper rouble. This measure enlarged the customs protection of the home manufactures by 25 per cent, as compared to the average exchange of the paper rouble during the time when the tariff of 1868 was in force, and by 30 per cent after the introduction of duties levied in gold; in after years it had a still greater protective

ded into three strongly different parts, namely: 1. from 1857 to 1860; 2. from 1860 to 1863, which coincided with the emancipation of the serfs and with the cotton crisis; 3. from 1863 to 1867; during the second period of time a considerable decrease of the industry may be noticed, while in the last it is again fast rising, as shown in the following table.

M A N U F A C T U R E S.	1858 to 1860.	1861 to 1863.	1864 to 1867.
	Increase.	Decrease.	Increase.
	P e r c e n t s.		
Cotton spinning	11.6	9.8	16.5
Cotton weaving	5.5	15.8	24.3
Woollen fabrics	6.8	10.3	18.5
Printing and finishing	9.4	3.3	10.7

importance, as the paper rouble still further depreciated *. This measure did not alter the economic order of the customs tariff, as raw materials with a few exceptions were as before subjected to the lowest duties, while higher taxes were placed on half-wrought materials, and still higher on finished goods, always *ad valorem*.

The levying of duties in gold had besides the protective, also a financial importance. The rapid economic development of Russia's agricultural, manufacturing, and trade industries from 1865 to 1875 and the building of a vast network of railways, comprising a line of 20,000 versts, engendered the want of drawing a large amount of foreign capital to the Empire. This was effected in different ways. Railways were constructed by means of issuing, and sending abroad railway bonds, mostly guaranteed by the Government; landowners, in order to get the money necessary for farming, mortgaged their estates to banks, which placed these mortgages abroad; many trade and manufacturing undertakings were founded upon the advances received from foreign capitalists, or upon the credit the latter opened at some of the Russian bankers and commercial bond banks. In consequence, the Russian foreign debts increased considerably, exacting yearly large sums for interest and partial payments. Thus, the payments for Government loans, for bonds of the Nicholas Railway, and for the consolidated and guaranteed bonds, amounted in 1866 to 25 million roubles, and in 1875 they grew to 66 million roubles. On considering this state of affairs, and the fluctuations to which the exchange of the paper rouble was subjected, it may be seen that the levying of the customs duties in gold afforded a certain source to Russia for the payment of foreign obligations.

After 1877 the Government raised repeatedly the customs duties in general, or only on some special articles with the view of enlarging the income of the State Treasury, and of establishing more advantageous relations between the import and export trade, considering that the latter could not always be equal, as Russia is mainly an agricultural country; therefore, it would be highly desirable to limit the import as it increased the Russian foreign debt, the exchange of the rouble being subject to many fluctuations. At the end of 1881 all the import duties were raised 10 per cent, except those on salt, this measure being called forth by the necessity of making up for the losses in the State revenues occasioned by the abolishing of the excise upon salt. In 1882 duties were levied upon some articles that were duty free under the tariff of 1868; and those on some goods, chiefly consumed by the richer classes, were raised.

The revising of the tariff in 1882 had also in view the encouragement of certain industries not sufficiently protected from foreign competition. According to this tariff the duties were somewhat raised as follows: a. on linen cloth, ready-made clothes, and linen, *ad valorem* duties were changed to specific; b. woollen yarn, in order to protect the Russian sheep farming from a vast import of the cheaper foreign wools; c. candles and soap, as the prices for foreign tallow had considerably lowered; d. fossil wax and ceresin, as surrogates of beeswax, capable of prejudicing the Russian agriculture; e. some of the chemical products and dyes allowed by the tariff of 1868

* The average annual value of the gold rouble in paper kopecks was as follows: in 1877, 150; in 1878, 157; in 1879, 159; 1880, 154; in 1881, 153; in 1882, 161; 1883, 163; 1884, 158, in 1885, 161; in 1886, 165; in 1887, 181; in 1888, 172; in 1889, 150.

under very small duties, as materials used in manufacturing. With the same protective views a duty was placed by the tariff of 1882 on completed vessels, which until then were imported free. In 1884, on some of the foreign wares duties were raised with the aim of increasing the fisc, namely: a. on cured herrings; b. on black and brick tea, imported across the European as well as across the Asiatic frontier; c. on wine, sparkling as well as non-sparkling; d. on silk yarn; e. on vegetable oils.

In 1885, in order to uphold a profitable trade balance which threatened to change unfavourably for Russia, as some of the countries of the Western Europe had then introduced protective duties on imported household goods, especially on grain, a general raising of the customs duties on imported goods, reaching 20 per cent, with the exception of a few articles was made. On one hand, the duties on some of the foodstuffs and wares which were thought to be sufficiently high, as well as on raw and half-wrought materials, necessary to the Russian manufacture, were either left without change or raised only 10 per cent; on the other hand, the taxes on some of the goods, especially on finished wares, which were not affording the needful protection, were raised by more than 20 per cent. On some goods which had until then been imported free, protective or moderate treasury dues were placed. Finally, in 1887, as the customs revenues tended to decrease, owing to the protective measures taken with regard to pig iron, iron, and iron wares, as will be seen later, higher duties were levied on vegetables, fruit, herrings, spices, Kiakhta teas; on raw cotton, plants, joiner and turner work; on farming implements; on cotton yarn and thread, tulle, lace, coarse cloth of flax, hemp, jute, and the like; on buttons, glass beads, small trinkets, toys, watches, and patent medicines.

Owing to the above mentioned measures, the customs revenues, notwithstanding the decrease in the import due to the reinforcement of the protective policy, were in no way lessened, but grew by as many per cent during the time when duties were levied in gold, as when the moderately protective tariff of 1868 was in force. Thus the average amount of the duties for the first three years, from 1869 to 1871, was 42,300,000 paper roubles; and for the last three years under the tariff of 1868, from 1872 to 1875 *, it grew to 57,200,000 paper roubles, or 36 per cent. The average yearly amount of the customs duties for the first three years following the instalment of duties in gold, from 1878 to 1880, was 60,600,000 roubles in gold; and in the succeeding years, from 1888 to 1890, it grew to 80,500,000 roubles in gold, or 33 per cent; this sum, if reckoned by the exchange which existed at the period, equalled 124,000,000 paper roubles, in opposition to the 57,000,000 paper roubles at which the amount of duties during the last year under the tariff of 1868 was fixed.

However, the greatest attention was paid to the protection of such branches of industry as needed help, as well as stimulation. It was regarded as a rule to change the duties gradually on some special articles, or on a separate group, according to a thorough investigation of the needs of the industry, and to the interest of the consumers; a general revision of the tariff was postponed until the time when the principal questions referring to the protection of the home production, and to the taxing of the home consumption, would be clear enough; such a general revising

* The year 1876 has not been taken into consideration, as an excess in the import of wares was noticed owing to the expectation of the instalment of duties in gold.

was made in 1890 to 1891, the result being the new tariff now in force, and which will be reviewed in detail in Section IV, tariff of 1891.

The first place among the customs measures of the decade 1880 to 1890 must be allotted to those encouraging a larger development of the Russian metallic industry, using home-produced raw materials, such as pig iron and iron, and local coal as fuel. In order to have a correct idea of the importance of the last years protective tariff to the metallic industry and manufacture of wares from metals, it should be compared to the customs measures of the former times.

In the fifties, the duty upon pig iron was highly protective, as its dimensions were 1.03 roubles; and later on 0.50 roubles, and the import by sea being totally prohibited. At the end of the Crimean war a total change ensued. The Government resolved to use energetic and und deferred measures to raise the economical condition of the country; it was then that the building of railway lines in Russia, conformably to the wants of the manufacture and trade, as well as to those of the Administration, was reckoned as one of the best means leading to the above mentioned aim.

In order to help and further business, the Government resolved to facilitate essentially the bringing of metals from abroad. According to the tariff of 1857, pig iron and iron were for the first time allowed to be imported by sea, the duty on pig iron being 15 kopecks per poud, and that on iron, according to the sort, from 50 to 90 kopecks per poud, with a lowering to 30 kopecks if imported by land. Such facilitation of the import of pig iron and iron was chiefly due to the following considerations: 1. the insignificant working of metals in Russia (15 million pouds of pig iron, and ten and a half million of iron) could not be soon increased because wood coal was almost exclusively used in the manufacture, and the exhaustion of the forests could easily influence its decrease, as well as because the condition of many of the mining works was far from being satisfactory, while owing to the development of the manufacturing industry, and especially to the building of railways, the demands for iron grew constantly; 2. the iron-works being chiefly centred in the Urals, namely, four-fifth of them, and the one-fifth in the vicinity of Moscow, the transport of the metal to the different parts of the Empire was considerably surcharged. The duties were placed of such dimensions as to render the foreign cast-iron, and iron, even of the lowest sorts, a little dearer than the Russian for the central parts of the Empire, as Moscow and Nizhni-Novgorod. In order to encourage the establishment of the working of pig iron, and iron of the local ores in the south of Russia, the import of these metals straight from abroad through the ports of the Azov Sea was prohibited.

Other changes were soon made in the tariff of 1857, with the view of facilitating the import of metals. In 1859 the duty on pig iron was lowered to 5 kopecks, and steel altered accordingly; in 1861 these metals were allowed to be imported free of duty by the machine-building factories, as the tariff permitted a free import of all kinds of machines and implements; and in this state of affairs the duties on pig iron, and iron formed, so to say, a premium to the advantage of the foreign makers, and to the prejudice of the Russian machine-building industry. At first only such machine works were allowed to import pig iron and iron in quantities needed by them for the construction of machines and implements, as had steam or hydraulic motors. But later on, this franchise was extended to the works engaged in the building of ships, Men of War, hydraulic apparatus, iron bridges, as well as artillery supplies, guns,

and gun carriages; and in after years, the metals used in the working of railway appliances for the rolling stock and railroads, as well as in the building and the of the establishments themselves, were permitted likewise to be imported free of duty.

By the customhouse tariff of 1868, the regulations about the duty-free import of cast-iron and wrought iron for machine and engineering works were kept in force, although a duty of 75 kopecks per poud was levied upon locomotives, and 30 kopecks per poud upon all kinds of machinery, appliances, and instruments except agricultural, paper making, and those used in the manufacture of fibrous substances. The prohibition against importing cast and wrought iron into the Azov ports was also cancelled by this tariff. The duty on wrought iron was fixed at 35 kopecks per poud for bar iron, assorted, merchant iron and scrap; 20 kopecks per poud for rails; 50 kopecks per poud for sheet iron, boiler, and armour plate; and 80 kopecks per poud for steel. During ten years from 1868 to 1878, the mean yearly import amounted to about 2,500,000 pouds of cast iron, including 2,250,000, or about 90 per cent, free of duty, and about 5,700,000 pouds of wrought iron, including 3,600,000, or over 60 per cent, free of duty. In the space of the following three years the import of these metals considerably increased owing to the brisker condition of trade after the eastern war and under the influence of the duty in gold, and also on account of the demand for foreign cast-iron for making steel rails, at the converting works. The average yearly import for the period 1878 to 1880 was 10,900,000 pouds of cast-iron, including 5,600,000, or over 50 per cent, free of duty; and 8,000,000 pouds of wrought iron, including 3,300,000 pouds, or more than 40 per cent, free of duty.

It soon became apparent that the application in practice of the rules granting the free import of cast and wrought iron for engineering works, did not have the result which the law had in view in granting the privilege, as most of it was used in the manufacture, not of machinery and agricultural instruments, but of rolling stock and railway appliances as well as of goods for the artillery department. Therefore, and considering that the Government had taken other measures toward developing the production of railway appliances, such as raising the duty upon locomotives and tenders, fixing a premium on steel rails, and locomotives made at Russian works, including a clause in the concessions of Railway Companies with reference to acquiring railroad materials and rolling stock in Russia, in 1880 the supremely-confirmed decree of the Council of the Empire, dated July 3, pronounced that it was expedient, from January 1, 1891, to abolish the privilege of importing cast and wrought iron for engineering works free of duty; and in addition to this the duty was simultaneously raised to 80 kopecks in gold per poud upon all machinery and tools made of wrought and cast-iron, and steel; this, with the addition of 10 per cent in 1881, brought the duty up to 88 kopecks in gold per poud. In 1882 it was raised to the round number of 90 kopecks in gold per poud. In the same year the duty on cast-iron was raised to 6 kopecks in gold per poud, and the fundamental duty on wrought iron to 40 kopecks in gold per poud; on the other hand, the duty on steel was lowered in the same proportion, with the view of equalizing the customhouse duties on wrought iron and steel, in the form of materials, the cost of their manufacture, excepting that of tool-steel, being almost the same.

Under the influence of the measures taken by the Government, machine construction and the manufacture of rails gained a footing, and many works sprang up which used foreign cast-iron. At the same time iron smelting in the country progressed but

slowly, and the manufacture of wrought iron, and goods therefrom, kept pace with it. This circumstance was deserving of particular attention according as the conditions were removed which prevented the establishment of foundries using Russian cast-iron. The network of railways constructed brought the source of the cast-iron nearer the large centres of trade and manufacture. The opening of the Ekaterininsk Railway in the South of Russia, which augured much for the iron smelting and manufacturing trades on account of the abundance of ores found there, lying almost side by side with inexhaustable veins of mineral fuel, was a means of enabling these branches of industry to become firmly established.

For this purpose the Government resolved in 1884 to raise the customhouse duty on cast-iron, and to protect coal mining with a duty which, up to that time, had only been levied in the Polish customs and on a very small scale; first $\frac{1}{2}$ a kopeck, and then 1 kopeck in gold per poud. The supremely-confirmed decree of the Council of the Empire, dated June 16, 1884, fixed the duty on cast-iron, either imported by sea or overland, at 9 kopecks in gold per poud, from July 1, 1884 to April 1, 1885; at 12 kopecks in gold per poud from March 1, 1885 till March 1, 1886; and at 15 kopecks in gold per poud from March 1, 1886. This duty was not to be subjected to any decrease during the space of twelve years from the date of its publication. In addition to this, the duty on iron ores was raised from 2 to 4 kopecks in gold per poud, in order to anticipate the possibility of any works springing up on the frontier regions, for smelting iron from foreign ores. As the duty on cast-iron was raised principally for the purpose of compelling the railway works to adopt the conversion of Russian raw material, the fundamental duty on wrought iron and steel, bar and merchant, was left unchanged at 40 kopecks in gold per poud; for the non-conformity prevalent up to that time, between the duty of 6 kopecks in gold on cast-iron and that of the $66\frac{1}{2}$ kopecks in gold average on wrought iron, presented a considerable premium for the manufacture of wrought iron out of foreign cast-iron, and occasioned a loss to the State, which only received about 12 kopecks instead of $66\frac{1}{2}$, calculating the maximum of 2 pouds of cast-iron to one of wrought iron; native labour also suffered a severe loss, as iron-smelting consumes a great amount of energy. The duty was only raised from 55 to 60 kopecks in gold per poud on some special kinds of wrought iron and steel in sheets and plates, and small, merchant iron. Those duties were also raised which were in connection with the protection of raw cast-iron; namely, customhouse duties upon machinery, and in general, upon cast-iron, wrought iron, and steel goods.

With reference to machines and instruments, attention was turned to the fact that, with the design of protecting agriculture, agricultural instruments had always been imported free of duty. At the same time the abolition of the free import of cast and wrought iron for engineering works and machine constructors had placed the Russian agricultural implement makers in a worse position than when they were competing with foreign goods. In 1885, therefore, it was deemed judicious to afford some protection to the manufacture of agricultural machinery and implements, which was however subject to a lower duty than any other kind of machinery; namely, at first 50 kopecks in gold per poud, when all other machinery was charged 1 rouble 20 kopecks in gold per poud, and in 1887, when the duty on cast and wrought iron was further raised, 70 kopecks in gold per poud, when the duty on other kinds of machinery was

1 rouble 40 kopecks in gold per poud. This moderate duty on agricultural machinery was also in accordance with those measures taken with the view of protecting the native metallurgical industry, as about 1 million pouds of cast-iron and wrought iron in the shape of agricultural machinery was imported into the country free of duty.

Whilst the duties upon these materials were being discussed in 1884 it became clear that, in order to completely guarantee the iron smelting industry in the Urals, in the South, and in Poland, it would be necessary to fix the duty on cast-iron at 25 kopecks in gold per poud. The Government, however, deemed it necessary to rouse the native iron-smelting trade by degrees and with caution, in order to gradually transform the so-called converting works gradually, and without occasioning any shocks to the trade; to enable them to manufacture wrought iron and steel out of Russian, instead of foreign materials, the increased production of the native article could only proceed slowly, as the number of blast furnaces increased, and this required time. The duty on cast-iron, therefore, only attained its full protective scale of 25 kopecks in gold per poud in 1887. In addition to this, as the converting, machine-making and iron works in Poland were, on account of their position near the frontier, more advantageously situated for obtaining foreign raw material, the duty on cast-iron at the overland customhouses was raised 5 kopecks in gold, to place the Polish works on equal terms with those of the Baltic coast. Simultaneously with the further increase of protection to the iron-smelting trade, the duties on wrought iron, steel, and also on cast-iron, wrought iron, and steel goods, machines, and ships, were correspondingly raised, in order to establish harmony between the duties on raw material and manufactured goods.

The influence of the measures taken towards rousing and developing the iron-manufacturing industry is clearly shown in the following table.

D A T E S.	Cast-iron smelting.	Cast-iron imported.	Manufacture of wrought iron and steel.	Import of wrought iron and steel.	Import of wrought iron and steel goods.	Import of machinery and imple- ments.
	I n m i l l i o n s o f p o u d s.					
1881	28.7	14.3	35.7	8.0	1.8	2.7
1882	28.2	13.4	33.3	7.3	1.5	3.3
1883	29.4	14.5	33.3	6.8	1.3	3.3
1884	31.1	17.3	34.7	5.4	1.1	0.3
1885	32.2	13.5	33.9	4.3	0.8	2.2
1886	32.5	14.5	36.9	4.5	0.1	2.2
1887	37.4	8.8	36.3	3.4	0.7	0.2
1888	40.7	4.5	35.8	8.9	0.9	2.5
1889	45.2	6.4	41.9	5.4	0.9	3.2
1890	56.2	7.1	49.5	0.6	0.8	2.9
1891	—	4.1	—	0.4	0.6	2.9
1892	—	5.1	—	3.4	0.6	2.4

This table shows that during the last 10—12 years iron smelting in Russia has almost increased 100 per cent and that the amount of foreign cast-iron used has decreased from 33 per cent in 1881 to 11 per cent in 1890, whilst the consumption of cast-iron has increased almost 50 per cent.

During the period under consideration, and in the same progressive manner as adopted with cast-iron, the Government has afforded increased protection to other branches of industry, such as coal mining, copper smelting, and chemicals.

Until 1884 coal and coke were imported free of duty through all frontiers except those of the Polish customhouses. In that year the first duties on these products were fixed, namely: at 2 copecks in gold per poud at the ports of the Black and Azov seas, and $\frac{1}{2}$ a kopeck in gold per poud at the Baltic ports; whilst at the same time the duty on coal and coke imported into Poland, and all through the extent of the western overland frontier, was increased to $1\frac{1}{2}$ kopecks in gold per poud. In 1886 the duty on the frontier of the Black and Azov seas was raised to 3 kopecks in gold per poud, and in 1887 a further protection was granted to the Baltic coast to the extent of 1 kopeck in gold, and to the western overland frontier of 2 kopecks in gold; and for the first time the duty on coke was increased one and a half times on account of its greater value and the fact that approximately $1\frac{1}{2}$ pouds of coal are required to produce one of coke. It is necessary to observe that, along the overland frontier and the Baltic coast, it was found indispensable to impart the requisite stability to the duty on mineral fuel in conjunction with those measures taken towards fostering the native iron-smelting industry; and, in accordance with this, it was determined that the duty of 1887 should not be raised until January 1, 1898, that is, for the same period during which it had been decided not to lower the duty upon cast-iron.

The question of duties on copper has been repeatedly examined during the last decade. In 1882 the first protection was granted to rolling copper in the form of a higher duty on sheet copper, namely, 1 rouble in gold per poud, instead of 66 kopecks per poud for copper in bars and ingots; in 1885 the duty on copper was raised to 1 rouble 50 kopecks in gold for bars, and 2 roubles in gold per poud for sheet copper. Finally, in 1886, in consequence of the heavy fall in the price of copper abroad, on account of the glutting of the market, and the rapid growth of universal supply, especially its enormous development in the United States of America, a further increase of duty took place, namely, 2 roubles 50 kopecks in gold per poud on copper bars, and 3 roubles 10 kopecks on sheet copper. In addition to this, copper ores were subjected to the same duty as copper bars, in order to anticipate the possibility of introducing copper, deposited by the wet process, under the name of copper ore. The duty on copper goods was also increased in a corresponding manner, in order to avoid any undue advantage in importing goods instead of materials.

The following protective measures were taken with reference to chemical products and colouring matters. When the tariff was revised in 1882 the duty was raised, among other things upon calcined soda from 20 to 30 kopecks in gold per poud, caustic soda from 30 to 45 kopecks, bicarbonate of soda from 20 to 30 kopecks, glauber's salts from 10 to 15 kopecks, and alum from 20 to 25 kopecks in gold per poud; on acetic, citric, tartaric, tannic, and gallic acids from 2.20 roubles to 4 roubles in gold per poud, on chemical and pharmaceutical products, not especially denominated,

from 1 rouble 10 kopecks to 2 roubles in gold per poud. In addition to this, a duty was levied upon some goods which had previously been imported free, such as refined sulphur and flour of sulphur, at the rate of 10 kopecks in gold per poud, and potash at 30 kopecks per poud. Later on, the duty was raised on soda, alum, ammonia, salts of ammonium, and fuming sulphuric acid as follows: in 1886 the duty on soda and caustic soda was 40 to 60 kopecks in gold per poud respectively, on fused alum and sulphate of alumina, used instead of alum, from 25 to 30 kopecks, forming sulphuric acid from 22 to 60 kopecks in gold per poud. In 1887 the duty on ammonia, except sulphate of ammonia and ammonium salts, was raised from 22 kopecks to 1 rouble 20 kopecks, and on sulphate of ammonia from 22 to 50 kopecks in gold per poud. All these additional duties were levied for the purpose of arousing those chemical industries which possessed all requirements for independent development inside the country. Thus, the manufacture of soda, when the tax on salt was abolished, was enabled to use cheap raw material especially on the banks of the Kama in the government of Perm, and in the south. The protection given to the manufacture of ammonium salts was quite opportune, on account of the progress made by the gas works which furnished all the necessary materials, and also on account of the cheapness of hydrochloric acid, and enabled the dyeing and printing works to obtain materials of native manufacture. The stimulation of the alum manufacture by suitable duties was also indirectly a means of encouraging the production of sulphuric acid required for the preparation of alum and sulphate of alumina. The duty was also raised on dyeing materials, such as colouring extracts, from 1.50 to 2.50 roubles in gold per poud, on aniline and all other coal-tar dyes from 4.40 roubles to 15 roubles in gold per poud and on madder extract from 2.50 roubles to 15 roubles in gold per poud.

Other particular changes in the tariff made during the same period were carried out in the same progressive manner of developing native industries, as those made for the above-mentioned goods, and characterized by the transition from protecting the manufacturing trade, employing foreign raw material, to fostering the native production of material for manufacturing these goods, and stimulating the output of native raw material by a corresponding duty levied upon foreign raw material. Thus, in 1882 the duty on silk thread was raised without altering that on silk stuffs; in the same year a particular subdivision of the tariff was made, raising the duty on carded wool above that on raw wool, whilst they had previously been taxed alike; a higher protection was granted to carding in 1889; and the duty on raw wool was also raised, in order to protect native industry. As regards cotton yarn, the former tariffs had only levied a duty on the lower numbers, and this was now extended to the medium and high numbers, as well as twisted yarn and sewing cotton. With the view of fostering the working of the natural wealth of the country, export duties were levied on phosphorites, as the process of converting them into superphosphates encourages the chemical industry, and provides the necessary substances for fertilizing the agricultural soil; also on the slags from the Polish iron-works, as they can be used in the blast furnaces as coke, and thus lower the cost of iron smelting; and whilst they were exported free of duty, the price of slags at home increased; and on palm wood and walnut wood, in order to preserve the palm and walnut forests in the Caucasus.

Between 1877 and 1891 in addition to the protective measures in the general tariff already mentioned, some special measures were also put into force, having the result of safeguarding the interests of native industry, namely: 1. the closing of the transit beyond the Caucasus; 2. the regulating of commercial intercourse with Finland; 3. a temporary addition of 20 per cent to the duties in 1890.

I. The question of the transit beyond the Caucasus, that is, of the free import of foreign goods into Persia through the region beyond the Caucasus, has attracted the attention of the Government on several occasions, and according as it has been found beneficial or injurious to the country in general, and for trade and industry in particular, various measures have been taken, either towards facilitating and encouraging the transit, or else towards impeding or even closing it.

In 1821 permission was granted to import into the region beyond the Caucasus, during the space of ten years, all kinds of foreign goods with a payment of 5 per cent on their declared price; at the expiration of that term the European and colonial goods, imported into the region beyond the Caucasus, were subjected to the tariff of 1822, which was then in force in the Empire, with some modifications consisting in a considerable reduction in the duties upon goods which were not considered formidable to Russian competition; whilst other goods, as for instance cotton fabrics, were taxed much higher than those upon which duty was levied in Russia, that is to say, the duty was made completely prohibitive; the 5 per cent duty was only left for Asiatic goods imported from Persia and Turkey; and finally, the import of European goods from the country beyond the Caucasus into Russia was entirely prohibited. The regulations of 1831 remained in force in the country beyond the Caucasus until 1848, when followed the opening of a free transit of European goods into Persia from Redout-Kaleh and Soukhoun-Kaleh through Tiflis and Nakhichevan, and for Persian goods from Baku, through Redout-Kaleh and Soukhoun-Kaleh. In subsequent times various alleviating measures for transits were adopted, the principal of which was the augmentation of transit routes; thus, in 1864 transit traffic was also opened to Tiflis-Baku, and thence by sea to Persia, in addition to the already existing route of Tiflis-Dzhoulfa. Soon after 1880, the turnover of the trade traffic by the European-Persian transit through the region beyond the Caucasus amounted to 10,000,000 roubles per annum, and that of the goods traffic of the Russo-Persian trade to 12,000,000 roubles. About this time, in consequence of the termination of two sections of the Transcaucasian railway, connecting the Black and Caspian Seas with an uninterrupted railway line, the further existence of the Transcaucasian transit was called into question, and the Russian manufacturers made strenuous efforts to have it completely closed, for the following reasons: 1. on account of its favouring the establishment of a smuggling trade in foreign goods, in the region beyond the Caucasus and on the shores of the Caspian Sea, and thus hindering the sale of Russian goods there; 2. on account of facilitating the competition between foreign and Russian goods in Persia; 3. threatening Russian goods with a similar competition in Central Asia.

After careful consideration of the matter, the Government decided that these reasons were worthy of the greatest attention, especially in consequence of the imminent opening of through railway communication between Batoum and Baku, which would considerably facilitate and quicken the delivery of foreign goods in transit through the

region beyond the Caucasus; and by an Imperial mandate, dated May 13, 1883, the transit import of foreign goods through the above-mentioned country was stopped.

II. The commercial intercourse between the Russian Empire and the Grand Duchy of Finland was fixed by a special ratified decree on December 20, 1858. These regulations were the outcome of the further development of those rules, so frequently altered since the annexation of Finland to Russia, concerning this intercourse.

When in 1816, after the renewal of the interrupted political and commercial intercourse between the European powers, a new customs tariff for the Russian Empire was issued, containing essential changes in the prohibitive system prevalent up to that time; this tariff was bodily introduced into the Grand Duchy, and it was also decreed that, when foreign goods were imported from Finland into Russia, they would be liable to a second duty according to the general tariff, on condition that the owners of the goods would recover the duties paid by them into the Finnish customs. By the decree of May 9, 1817, the same rule was applied to foreign goods imported from Russia into Finland. The import of Russian goods into Finland, and that of Finnish goods into Russia, were permitted free of any duty, but of the latter, only those which were mentioned in special registers, with a subdivision of such goods into those articles which might be imported without the presentation of a certificate proving their origin to be such, and those which required to be accompanied by such certificates.

When the tariff of 1822 was put in force in the Russian Empire, founded on the basis of the strictest protection, it was not extended to Finland, which in the same year received a special tariff of a comparatively moderate, conservative character. From that time the Grand Duchy and the Empire have not had any customs tariff in common, and the latest alterations in tariffs have been made separately in both countries, the Finnish tariff always differing from the Russian by a lower scale of duties. The inventories of Finnish goods imported free of duty into Russia have, in consequence of the assistance of the development of commercial intercourse between Russia and Finland, been repeatedly added to and enlarged; and, in addition to this, manufactured goods have been gradually added to the raw products and goods of the village industries, which they originally consisted of. The greatest facilities were afforded to the import of Finnish goods into Russia by the regulations of 1858, in which, amongst other things, the free, unlimited import of merchant iron, hoop iron, rails, and all paper mill produce, was permitted. These measures greatly tended to develop trade between the two countries; in 1858, the aggregate import and export turnover was 3,400,000 roubles, and in 1883 it rose to 31,200,000 roubles; towards the end of this period, however, the trade balance was not changed in favour of Russia, as for the 5 years between 1879 to 1883 the yearly export from Russia to Finland was equal to 11,900,000 roubles, or 1,600,000 roubles under the import from Finland to Russia.

As regards the different kinds of goods, it appears that the Russian export to Finland mainly consisted of provisions, to the extent of 55 per cent of the total export; then follow manufactured goods amounting to 26 per cent, and raw materials forming 19 per cent of the total. The principal item of import from Finland is, on the contrary, made up of manufactured goods, amounting to 55 per cent, then 30 per cent of raw materials, and lastly, 12 per cent of food-

stuffs. The amount of manufactured goods imported from Finland into Russia, and also of raw and half-wrought materials, not only constituted the principal part of the total import from there, but in a considerable measure exceeded the amount of manufactured goods and materials exported from Russia into Finland. Thus, in 1883, the amount of manufactured goods imported from the Grand Duchy into the Russian Empire was equal to 8,500,000 roubles, whilst the amount exported into Finland only reached 4,500,000 roubles; in the same year raw and half-wrought materials to the value of 5,000,000 roubles were imported into Russia, and only 3,500,000 roubles worth were exported from Russia. These figures show that, in consequence of the alterations in the conditions of trade and industry in Russia and Finland, and the measures taken here for protecting native industry, Finland, having the possibility of obtaining from abroad the implements of production and the raw materials duty free, or with a far lower duty than the Russian manufacturers, extracted far greater advantages than Russia from the regulations of 1858; and that the free import of Finnish goods into Russia might result, and prove detrimental to the development and success of Russian industry.

For this reason, in 1885 it was found necessary to alter the regulations referring to the import into Russia of those Finnish goods which formed the principal item of sale in Russia, and levy special regulating duties upon them, determined principally by the existing differences between the Russian and Finnish tariffs, in order to thus guard the Russian Empire from an overflow of certain Finnish produce, the manufacture of which might be receiving an artificial development in consequence of the difference in the customs duties.

These goods comprised: 1. writing and wall paper; 2. cast-iron, wrought iron, and steel, in the shape of raw materials and manufactured goods; 3. cotton fabrics and yarn; 4. dressed hides; 5. pottery, china, and glass, as the import of some of these objects began to assume very considerable proportions; for instance, in 1881 there were 565,000 pouds of paper imported, and 887,000 pouds in 1883; in 1881 there were 770,000 pouds of cast-iron and wrought iron imported, and 1,280,000 pouds in 1883.

When fixing the regulating duties for the class of goods already stated, the fact was taken into consideration that the difference in the expense of paying the duty on the foreign materials necessary in one or another branch of industry, did not exhaust all the advantages of some of the Finnish factories. In consequence of the more moderate duties in Finland on almost all foreign goods, the whole organization of the manufacturing trade was based differently to that in Russia; it was possible to start a factory on far less capital, and the cost of production was smaller. Finally, it was necessary to bear in mind that the district of Tammerfors, in which about 11 per cent of the manufacturing trade is located, enjoys until 1905 special privileges in obtaining materials and machinery from abroad duty free, in consequence of which the goods of the Tammerfors mills are much better able to compete with Russian wares.

On account of all these circumstances, the following protective conditions were fixed to the five categories of Finnish goods already mentioned: 1. writing paper was allowed to be imported in unlimited quantity, with a regulating duty corresponding, on the average, to the difference in the customhouse protection afforded by the

tariffs of that time to equivalent kinds of those goods in Russia and in Finland; 2. on the same basis regulating duties were fixed for china and glass ware, and the import of uncut and unground glass ware, and of a limited amount of china ware, to the extent of 30,000 pouds per annum, was permitted on payment of a duty lower than the general tariff; 3. regulating duties on dressed hides and cotton goods were calculated on the basis of the difference between the Russian and Finnish tariffs for necessary raw materials, such as cotton, raw hides, and tanning substances; besides this, the import of cotton goods was limited to 50,000 pouds per annum; 4. in the group of metals and metallic goods the most essential changes were made in the conditions under which they were imported into Russia, in accordance with those measures which were taken to encourage the native metallurgical industry. Until 1885, however, a limited quantity of wrought-iron material and goods, agricultural implements, and ships, were allowed to be imported free of duty from Finland.

In consequence of the considerable differences in the duties on cast-iron, iron blooms, ores, and mineral fuel in the Russian and Finnish tariffs, it was found practicable and profitable to bring into Russia from Finland not only iron of Finnish origin worked from native ores and pig iron, but even wrought iron manufactured at Finnish iron works from foreign ores or pig iron; and finally, foreign wrought iron blooms which had only been subjected to some slight treatment at the local ironworks. To counteract this irregular proceeding it was found indispensable to fix a regulating duty upon wrought iron materials imported from Finland, to the extent of 15 kopecks in gold per poud; this was fixed principally in accordance with the prevailing differences between the Russian and Finnish tariffs in the duty on cast-iron and blooms, and also to limit the import to 400,000 pouds per annum. The free import of cast-iron was, in general, prohibited, and an exception to this was only made in favour of the limited quantity of 400,000 pouds a year of cast-iron and blooms, made in the east of Finland from Finnish bog and lake ores, and with wood fuel. The amount of cast and wrought iron imported in excess of this quantity was subjected to the duty according to the general tariff. The importation of the following goods was permitted upon payment of a duty of 20 kopecks in gold per poud: a. sheet iron, wrought iron, and steel wares of any description, and iron castings, to the amount of 70,000 pouds per annum; b. machinery and instruments of all kinds, including agricultural and gardening implements, to the extent of 60,000 pouds a year. Finally, vessels of all kinds were subjected to duty according to the general tariff of Russia.

Lately, on account of further changes of a protective character having been made in the Russian tariff since 1885, which have had the result of increasing the difference between the Russian and Finnish tariffs, the question of changing the regulations referring to the import of Finnish goods into Russia has again arisen. The way has also been shown how to finally remove the difficulties which arise in commercial intercourse between the Grand Duchy and the Empire in consequence of the non-conformity of the tariffs: on the 21st of February of the present year 1893, an Imperial decree was issued to the Finnish Senate, commanding that measures should be taken to gradually raise the Finnish customs tariff so that it might in a few years, and in any case not later than 1905, be on a par with the Russian tariff.

3. The general raising of duties in 1890 was necessitated by the following

circumstances: since the introduction of duties in gold, the exchange of the gold rouble in paper kopecks remained constantly above 150 and during the period when the most important protective measures were taken, in 1888 and 1889, it attained 181 and 172, according to which exchange the scale of protective duties was calculated. At the same time, from the beginning of 1890 the value of the credit rouble abroad began to increase gradually, and in the month of August of that year the gold rouble was only equal to 129 paper kopecks. This marked improvement in the exchange, with the paper currency in vogue in Russia, would have occasioned a serious loss to native industry, had not corresponding measures been taken for the rise of the exchange lowered the price of foreign goods in the Russian markets, and facilitated the payment of duties upon them; and also, on the other hand, made it less advantageous to sell Russian goods for gold abroad.

It was therefore deemed expedient to raise the duties 20 per cent all round, and thus make them accord with the new state of the exchange rate; this was done by an Imperial edict, issued to the Minister of Finance August 16, 1890. In consequence of a general revision of customs tariffs having been already commenced at that time, these increased duties were only temporarily fixed until July 1, 1891. This increase was not levied upon coal and coke imported through the overland frontier and to the Baltic ports, upon coffee, cocoa, spices, tea and certain other articles, the taxation of which had a fiscal signification. On the other hand, the duty on coal and coke imported to the ports of the Black and Azov seas was increased to the maximum of 40 per cent, on account of the appearance of most unfavourable conditions in the competition of Russian with foreign coal, which, apart from the rise of the exchange, was also brought about by the lowering of import freights, and the lower price of coal in England.

I N D U S T R I E S.	1876.	1890.	Per cent of increase.
	In millions of roubles.		
Cotton spinning and weaving	102.7	246.5	140
Wool spinning and weaving	55.5	105.6	90
Dyeing, printing, and dressing	37.7	97.5	160
Flax and hemp spinning	20.1	33.3	66
Silk weaving	8.2	14.4	76
Paper making and wall papers	9.8	23.3	138
Chemicals, and colouring matters	5.5	17.7	222
Tanning	26.6	35.9	36
Glass and mirror making.	5.2	11.5	120
Pottery and china.	2.2	4.1	86
Machine constructing.	43.4	52.6	21
Total. . . .	316.9	642.4	102

The return of the Russian customs policy to the strict protective system, during the period between 1877 and 1881, was accompanied by a marked development in the manufacturing industries of Russia, which may be seen in the preceding table, which shows the production of the principal branches of native manufacturing industry in 1876, previous to the introduction of gold duties, and to 1890.

FOURTH PERIOD, THE TARIFF OF 1891.

The piecemeal changes in the customs tariff, introduced during the period between 1877 and 1890, satisfied the most serious and urgent demands to protect native industries, and the time then arrived for a general revision of the customs tariff. This arose from various considerations. In the first place it was necessary to take further steps to develop the customhouse protection by fostering, winning and working of the necessary raw materials, by levying a duty upon raw materials brought from abroad. The wealth of Russia in the natural products of all three kingdoms of nature showed the opportuneness of such encouragement after substantial progress in manufacturing industry had already been attained. It was furthermore expedient to remove the unequal protection in various branches of native production, which had naturally resulted from the repeated all round increase in the tariff, and also to afford the fullest possible encouragement to the radical branches of native industry, which gave work to the inhabitants of vast tracts of the Russian Empire. Finally, the altered conditions under which goods were manufactured, and the appearance of new products in the market, necessitated changes in the editing of the tariff clauses.

The revision of the tariff had already been commenced in 1887, but this most complicated and responsible task engrossed the attention and labour of almost four years. First of all, with the assistance of specialists detailed information referring to Russian foreign trade was worked out, touching the introduction of foreign goods and the actual condition of the various branches of manufacture at home and abroad; and preliminary suppositions concerning the necessary alterations in editing the clauses of the tariff and the extent of the rates were drawn up. This matter was then handed over to be examined by consulting deputations of trade and manufacture, by the stock-exchange committee, and by companies engaged in commercial and industrial enterprizes. The combined opinions of all these Councils and also petitions from private individuals concerning alterations in the tariff which they were desirous of having made, were examined by a Special Conference under the Presidency of the Minister of Finance, composed of members of the Ministry and professors of the St. Petersburg Technological Institute; and the new tariff scheme thus elaborated was discussed by a special committee, appointed by the Emperor, and also under the Presidency of the Minister of Finance. This committee was composed of members of different Government offices, representatives of trade, industry and agriculture, and technical specialists.

The new customs tariff was passed by the Council of the Empire, and ratified by the Emperor on June 11, 1891, and put into force on July 1, of the same year.

The following order was observed in grouping the clauses: the first 39 refer to the duty on articles of consumption; the second group, clauses 40 to 57 inclusive, includes furs, hides, leather goods, and also the products of animal life and their derivatives, such as, bones, glue, tallow, hair, et cetera. The third group, clauses 58 to 64 inclusive, principally consists of timber and wooden goods, and also plants, and wicker work of vegetable materials. The fourth group, clauses 65 to 78 inclusive, refers to the duties on building materials, polishing substances, goods made of ordinary clay or fire clay, pottery, faïence, and china and also glass ware, and mirrors. The fifth group, clauses 79 to 88 inclusive, comprises coal, naphtha, asphalt, various vegetable tars and their products. The sixth group, clauses 80 to 137 inclusive, consists of the materials and products of the chemical works in the broadest sense of that expression, and which may be subdivided into chemicals proper, cosmetics, lacquers, varnishes, dyeing and tanning preparations. The seventh group, clauses 138 to 175 inclusive, embraces ores and metals and metallic goods, also machinery and watches, clocks, musical instruments, equipages, cars and ships. The eighth group, clauses 176 to 178 inclusive, deals with the produce of the paper-making trade and printed matter. The ninth group includes the following 31 clauses, from 179 to 209 inclusive, and comprises spinning materials and the goods manufactured from them. Finally, the last and tenth group, clauses 210 to 218 inclusive, embraces hats, umbrellas, buttons, artificial flowers, jet, jewelry and other articles not mentioned in the other groups.

In general, the number of clauses of the tariff has been abridged from 253 to 226; out of this total the inventory of the goods which are allowed to be imported has been abridged from 241 to 218, that of the prohibited articles, from 12 to 8. The inventory of export goods paying duties retains its former number of clauses, namely 7.

The character and bearing of the alteration made by the tariff of 1891 will easily be seen in the following review of the principal of these changes, according to the separate groups of goods.

1. The chief alterations of a general character in the group of articles of consumption are directed towards raising the duty on certain products imported in a prepared state, ground, or pressed, and on others, if they are imported specially packed to the consignee, and generally denoting goods of a superior quality, such as mustard in small packets, starch, and salt in packets and boxes. In the taxation of salt, attention was given to the fact that the native salt industry had reached a considerable degree of development, and was able to compete with foreign salt on the shores of the Black and Azov seas with complete success. Accordingly, the former prohibition against the import of salt into the ports of the Black and Azov seas was annulled by the tariff of 1891, and a general duty of 20 kopecks in gold per poud on all frontiers was instituted, except for the ports of the government of Archangel, where the lower scale of 10 kopecks in gold per poud was retained. The differential duties on sugar through different frontiers were abolished on account of the small quantity imported; the prohibition against the import of grain beverages in barrels and large vessels was also annulled, and a duty of 12 roubles in gold per poud on the gross weight was fixed, in accordance with the inland excise. Finally, in order to encourage the home production of strong wines, similar to those of Spain and Portugal, in addition to the duty by weight of 4 roubles in gold per poud gross,

a supplementary duty on wines containing over 16° of alcohol was fixed at 12 kopecks in gold for every degree above that quantity.

2. With reference to the group of hides, leather goods, furs, and animal products, the fact was taken into consideration that usually very thick hides are imported, and which the Russian cattle are not able to yield on account of climatic and natural causes, and therefore high duties on such hides would not extend any protection to native rural economy, and would only be an obstacle to the manufacturers using them. The duties, therefore, on undressed hides were left as they were before the addition of the 20 per cent. The more costly kinds of dressed leather, kid, morocco and chevrette, were subjected to a higher duty of 15 roubles gold per pound, which was also extended to small, varnished skins, previously admitted on the same terms as large skins; the duty on ladies boots, and shoes of chevrette was also correspondingly increased to 2 roubles gold per pound, and on other kinds, to 1 rouble gold per pound, instead of the former rates of 1 rouble 45 kopecks, and 70 kopecks gold per pound respectively. As regards the other varieties of dressed hides, in consequence of the very small quantity imported it was considered sufficient to make only a slight increase to the duty in force, until August 16, 1890. Then the various leather goods, upon which previously the same duty had been paid, were divided by the new tariff into two classes, saddlers goods being subjected to a lower duty, and trunks and portmanteaux being charged dearer. Finally, such articles as had more the character of half-wrought materials, such as straps and stitched uppers, were rated at a medium duty between those of dressed hides and leather goods. The duties on tanning substances were examined with reference to protecting the leather industry. In accordance with the fundamental principles of the tariff revision, those tanning substances imported in the form of powder were subjected to a higher duty in order to cooperate with the introduction of their pulverization into Russia. The duty on tanning substances, imported in their natural condition was lowered from 7 to 5 kopecks gold per pound, in the interests of the development of the leather trade. In a like manner, the duty on tanning extracts, such as chesnut, hemlock, which have a wide application in that business, was lowered from 2 roubles 50 kopecks to 30 kopecks gold per pound.

The duties on the more costly kinds of furs were raised, and the distribution of the furs according to the separate paragraphs of the clause was altered, in order to determine in the most exact manner the co-relation between the duty and the value of the fur.

3. The principal alterations made in the group of timber, wooden, and basket-work goods were: common kinds of wood, squared up and sawn, were subjected to duty, in order to protect native wood working; the duties on carpenters and coopers work were raised. With regard to basket-work goods, the rates of duty were made to correspond closely with the cost and excellence of the workmanship of the article; so that instead of the two scales of the former tariff, one very low, at 18, 24, and 55 kopecks gold per pound according to kind, and the other exceedingly high, at 1 rouble 5 kopecks gold per pound, several intermediary rates at 60 kopecks, 5 roubles, 15, 25, and finally, 40 roubles gold per pound, were fixed. A further sensible protection was afforded to the higher classes of joiners and turners work. The duty on furniture was largely increased; according to the former tariff it had been

imported as joiner work, adding 25 per cent for the trimmings; according to the tariff of 1891, furniture covered with linen or having cane bottoms, pays a duty of 6 roubles gold per poud, and if covered with stuff or leather, 10 roubles per poud. Moreover, as beech furniture is being much imported, an increased duty is laid on the ready-made articles as well as on the separate parts of that kind of goods, not to encourage the import of foreign materials.

4. In order to protect the home materials used in the ceramic industry, a duty is levied upon the foreign raw materials, as follows: clay used in manufactures, and in architecture, and formerly imported free, 2 kopecks per poud; such materials as gypsum in pieces, fat calx, and burned chalk, formerly only taxed on the Baltic borders, 3 kopecks per poud. In like manner the duty on cement, on some articles of earthenware, fire clay, glazed brick, and majolica has been increased. Instead of the two, graded duties on pottery, one of 26 kopecks, and the other of 1.30 roubles per poud, three progressive duties have been levied, namely 30 kopecks, 75 kopecks, and 1.50 roubles per poud, according to the value of the goods.

In the glass industry it has been especially noticed that there has been a considerable import of fine glass ware, and of mirrors of small dimensions, and that the development of the home manufacture of looking-glasses has been slow, notwithstanding that the duty laid on foreign mirrors is considerable. In order to do away with the first condition, unfavourable to Russian industry, the duty on foreign glass ware and on small mirrors has been increased. The reason of the small development in the production of Russian sheet glass seemed to lie in the former tariff, according to which the duty on polished sheet glass differed much from that laid on the unpolished; the first was imposed according to the dimensions of the surface, and the second according to weight. For this reason the polishing of foreign glass became a prominent business in Russia. In order to remove such an irregularity in the Russian industry, it was found necessary to tax the raw material also according to the superficial dimensions, and to make the difference between the duty on raw and polished glass so small, as to render the working of foreign material unprofitable.

5. In the tariff of 1891 special attention was paid to chemical goods especially so, as according to the tariff of 1868 the chemical industry was considered of secondary importance, and therefore the duty on chemicals was very small, and so remained until 1891.

Great changes have been made in the duties of the following chemical goods: on potassium chlorate, and sulphate, as well as on the crude chloride of potassium which was admitted free until the tariff of 1891 laid a duty on it of 15 kopecks per poud; a duty of 20 kopecks per poud was levied on raw naphtha, phenol, and benzine; and that on anthracene, which was formerly 2.40 roubles, was decreased to 20 kopecks per poud. The lowering of the duty on anthracene, simultaneously with the raising of that on anthraquinone, from 2.40 to 4 roubles gold per poud, tended to encourage the production of alizarin from anthracene and not from anthraquinone which is a half-manufactured product. In order to encourage the working of Russian sulphur, which exists in great quantities in the Empire, and to force Russian manufacturers to make sulphuric acid from sulphur pyrites, which would cheapen much the fundamental material of all chemical works, a duty was imposed by the tariff of 1891 on raw sulphur. But, as the principal Russian sulphur deposits are in Dagestan

and the Transcaspian regions, from which only the southern governments can be supplied, the duty on sulphur, 5 kopecks per poud, is established only for the ports of the Black and Azov seas; for the other frontiers the duty is only 2 kopecks per poud, the motive being not to lay too great a burden on the chemical industry, which has great need of this product. For producing sulphuric acid from pyrites much expense and time must be laid out before the manufactories are adapted to the work; furthermore, much depends on the distance of the works from the pyrites deposits, on the convenience of transport, on the quantity of brass contained in the pyrites, and on other kindred circumstances. In order to encourage the development of products which serve as manure, much needed for agriculture especially in the non-*chernoziom* regions, the import of such materials, as well as of raw bone and unground scoria, remains duty free also in the tariff of 1891; but raw bone and ground scoria are taxed 2 kopecks per poud gross; hyperphosphates, bone cleaned with sulphuric acid, and fertilizing powders, have a tax of 5 kopecks per poud gross; and finally, burnt bone, bone ash, and bone coal pay the highest duty, namely, 12 kopecks per poud gross. Wine stone, or tartar, which is secured in Russia in abundance at the wine manufactories, is subject to different rates of duty, dependent on the quality. The duty imposed thereon is specially calculated, in order to maintain, on the one hand, the home production, and on the other, not to encourage the importation of the raw material. The duties are rated as follows: on crude tartar, from 0.26 to 0.60; on purified, from 0.26 to 2.40; on cream of tartar, from 2.40 to 4; and on tartaric acid, from 4 to 5 roubles gold per poud. Although in 1868 the duty on bicarbonate of soda was raised from 15 kopecks, and that on calcinized from 30 to 40 kopecks, thus decreasing the import; however, as the home production was still very considerable, about 700 pouds yearly, the duty on soda was raised in 1891 from 40 to 55 kopecks per poud. Moreover, the foreign product, owing to its manufacture abroad, was sold at a price too high for the Russian consumer. The establishment of a home soda manufactory, especially if according to the method of Leblanc, would be of very great importance to Russia, the more so as by that method important chemical products may be obtained.

Chloride of lime pays a duty of 70 kopecks per poud under the tariff of 1891, whereas the former duty was only 44 kopecks; this increase was made to protect the manufacture of soda in the Empire. In taxing vinegar powder, the duty to be imposed on vinegar itself was taken into consideration. Russia has all the conditions necessary for producing vinegar powder; nevertheless, during the preceding tariff, a reproduction of foreign powder took place in Poland. Many chemical and apothecary goods, not mentioned separately, paid a duty of 2.40 roubles gold per poud. But it was discovered that products of very different value were taxed alike, and that for some of them the duty of 2.40 roubles was too small. Therefore, in 1891, products requiring a higher duty were taxed separately, thus: silver, gold, and platinum salts, 8 roubles gold per poud; benzoic, tannic, citric, salicylic, sulphuric, chromic, gallic, and pyrogallic acids, 6 roubles gold per poud. In the wood production, special effort has been made to encourage the manufacture of white resin, the duty on which is increased from 13 to 40; and on turpentine, from 40 to 60 kopecks per poud, as the getting of products from wood by dry distillation was one of the most ancient industries of Russia, especially developed in the rich forest regions of the north-eastern part of

the Empire. To protect such ancient industries was one of the principal aims of the tariff of 1891. The duties on colouring materials and dye stuffs have not been subject to such great changes as the other sections of the chemical group, statistics having shown that dyestuffs, print-stamps and the like, so much developed in Russia of late years, have been supplied by home production. The duty has been increased on some preparatives, which have a great trade importance, and the home production of which would be very desirable, for example: on artificial pigments, produced during the distillation of gas tar, the duty is raised from 15 to 17 roubles gold per poud; ultramarine and smalt in powder, from 2.65 to 3.30 roubles gold per poud; verdigris and other brass colours, the duty on the former being raised from 3.30 to 4, and for other colours, from 2.20 to 4 roubles gold per poud.

6. In the mineral-fuel group the following changes have been made: sulphur pyrites have been taxed 1 kopeck gold per poud, in order to encourage the home production, as they are indispensable in the making of sulphuric acid. To prevent the import of such sulphur pyrites as serve for melting copper, the rule has been established, that the above mentioned duty is imposed only on such pyrites as do not contain more than 2 per cent of pure copper, and those that contain more are taxed two and one-half kopecks per each per cent of copper. The same duty is imposed, under the tariff of 1891, on copper ores, and copper scoria, namely, two and one-half kopecks per each per cent of pure copper per poud.

Above it has been explained why the duty on stone coal and coke was temporarily raised in 1890, in the southern ports, to 40 per cent, so that on stone coal it formed 4.2, and on coke, 6.3 kopecks gold per poud. After the reconstruction of the tariff the duty on coal and coke was left unchanged until July 1, 1892, when, owing to the fact that the coal trade was not founded in the south on absolutely firm foundations, the duty on stone coal was fixed at 4, and on coke at 6 kopecks per poud.

7. In the metallic group the greatest attention was paid to cast-iron. As the duty of 1887 was found insufficient to limit the import, especially when the rate of exchange became high; and as, since the imposition of a duty on foreign cast-iron, the home production began to develop, it was thought advisable to increase the tax on that important metal to 20 per cent, comparatively to that fixed in 1890. Thus, this duty was 30 kopecks gold per poud on cast-iron imported by sea, and 35 kopecks on that imported over the western overland frontier. On special sorts of cast-iron, such as manganesic, silicious and chromic, owing to the high price of such manufactures and to their great development in the metallurgical industry, a duty of 50 kopecks per poud was levied.

The duty on iron and steel has also increased, conformably to that on cast-iron. According to the tariff of 1891, the highest duty was imposed on some sorts of cast-iron, which was formerly the same as on assorted, and on fine sheet iron, above No. 25, according to the Birmingham gauge. The latter regulation tended to encourage the home production of tin, which, during the former tariff, owing to the small duty on foreign tin, and on fine sheet iron, was principally manufactured from foreign iron.

8. The duty on machines, the production of which has developed in Russia much slower than the other industries, was raised but little, in order not to embarrass

the growth of such industries as use machines. This duty, imposed in 1890, was 20 per cent higher than the former. The increased duty on farming implements, in 1890, was found too high, owing to the difficult position of the agricultural industry in Russia; therefore the duty on such machines was left the same as in 1887, namely, 70 kopecks per poud. For the same reason the duty on steam thrashing machines was decreased from 2 to 1.40 roubles per poud. The same duty was fixed also on scythes, sickles, shears, rakes, shovels and the like; and also on hand instruments for different trades, arts, factories and works, in order to make the acquisition of these useful machines more easy.

9. In fixing the duty on spinning materials and on spun articles, it was taken into consideration that ready products from such materials were sufficiently taxed under the former tariffs, and that it was only necessary to take measures for developing the home production of raw material and of half-manufactured goods.

In order to maintain the cotton industry in the regions of Central Asia, the duty on raw cotton was increased, according to the tariff of 1891, from 1 to 1.20 roubles, and through the overland frontier, from 1.15 to 1.35 roubles gold per poud. In 1893 it ranged from 1.40 to 1.55 roubles gold per poud. As to jute, which is a constant competitor with the local spinning materials, the duties on the raw fibre and on jute tissues were fixed in closer relation than in the former tariffs, when the manufacture of stuffs from foreign jute was much developed. In the wool industry the growth of the production of combed wool in ribbons, greatly needed in the making of tissues from raw wool, was especially taken in consideration in 1882, and the tendency of the tariff of 1891 was also in the same direction. During the former tariffs, owing to the fact that the duty on raw wool, combed wool and woollen tissues was the same, the import of combed wool increased. But, as explained above, the encouragement of the home production of combed wool is of very great importance, not only to spinning mills, in order that they should not be dependent on foreign half-manufactured materials, but also to the home industry of sheep farming, which produces a sufficient quantity of raw wool for combing. Therefore, the relation between the duties imposed on wool, raw and combed, and in tissues, has been changed in the tariff of 1891, in such a manner that the difference between the duty on combed wool and woollen stuffs is lessened, and that between the duty on raw and combed wool increased. This object was obtained by preserving the former duties on raw wool, which was 2 roubles, and on tissues, 9 roubles per poud, and by increasing the duty on combed wool from 4.50 to 5.50 roubles per poud.

In the tariff of 1891, measures were taken to develop the silk-twisting industry in Russia, in order to protect the silk-spinning mills, which were dependent on the foreign producers of twisted silk. Therefore, the duty on undyed silk tissues was increased from 16 to 40, and on dyed tissues, from 32 to 56, roubles gold per poud. But not to overburden the Russian silk-spinning industry by raising too much the prices of materials, so long as the silk-twisting mills are not sufficiently developed, it was found necessary to gradually increase the duty on silk, as follows: until July 1, 1893, 30 and 40 roubles per poud, and thereafter, to impose the full duty fixed in the tariff of 1891.

From the foregoing it is seen that the new tariff tends principally to encourage in a uniform manner all the branches of Russian industry in its different stadia, from

raw and half-wrought materials, to valuable manufactured goods. The duty has been considerably increased only on certain articles, namely, on such as were not sufficiently taxed to restrain their import. The advancing of the duties had no fiscal aims; on the contrary, in many cases, when the duty was found too high compared either with the value of the goods, or with the development of the industry, it was lowered, especially as compared with the duties which were fixed by the Imperial statute of August 16, 1890.



CHAPTER XXIV.

Review of foreign trade.

GENERAL AND SPECIAL TRADE OF THE EMPIRE.

In the general trade of Russia, including the Grand Duchy of Finland, the import in 1891 amounted to 414,000,000, and the export, to 751,000,000 paper roubles. These figures are distributed as follows: from abroad, 390,000,000 paper roubles, of which 24,000,000 roubles worth were imported to the different governments of Finland; the export of goods, 722,000,000 paper roubles, of which 17,000,000 paper roubles worth were sent from Finland; the return of consigned exports, 1,000,000 paper roubles; the return of consigned imports, 6,000,000 paper roubles; the transit of foreign goods through the Empire, 4,000,000 paper roubles; the transit of Russian goods through foreign countries and coastage, 19,000,000 paper roubles.

In the special trade, together with Finland, the import amounted in 1891 to 384,000,000, and the export, to 721,000,000 paper roubles.

Data showing the foreign trade of Finland, and which form a separate accountability, are given below by themselves. Excluding them, and considering Finland as a separate customhouse, the totals of the foreign trade of Russia itself are represented on the average, from 1886 to 1891, by the following figures: in the general trade the import was 425,000,000, and the export 702,000,000 paper roubles worth; in the special trade the import amounted to 405,000,000, and the export to 682,000,000 paper roubles. The yearly average export exceeds the import by 277,000,000 paper roubles. The mentioned figures are formed from the following: the import of foreign goods, including those of Finland, amounted to 410,000,000 paper roubles; the export of Russian goods abroad and to Finland, 683,000,000 paper roubles; the return of consigned imports 5,000,000, and the return of consigned exports, 1,000,000 paper roubles; the transit of foreign goods through the Empire, 4,000,000, and the transit of Russian goods through the foreign countries, and coasting, 10,000,000 paper roubles.

From 1886 to 1891 the import through the different customhouses of the frontier was as follows: through the West European frontier, 86 per cent.; through the Black Sea border of the Caucasus, 2 per cent; through the Irkutsk customhouse, 5 per cent.; through the other Asiatic customhouses, 4 per cent, and to Finland, 3 per cent. These figures show the predominating importance of the West European frontier, which is also seen in the figures representing the export trade, thus: goods exported through the West European frontier form 90 per cent of the total export; through the Black Sea border of the Caucasus, 6 per cent; through the other customhouses of the Asiatic frontier, 2 per cent, and to Finland 2 per cent.

FOREIGN TRADE OF EUROPEAN RUSSIA.

General totals.

Since the abolition of the customhouse line between the Polish and the other governments of European Russia, in 1851, the frontier of the Empire has undergone little changes in the south-western border; and, therefore, data showing the development of the foreign trade, during 42 years, from 1851 to 1892, in relation to the territories they embrace, may be relatively compared. After the construction of the Vladikavkaz Railroad a close connection ensued between the northern Caucasus, which forms part of Asiatic Russia, and the region round about the Azov sea, which is in European Russia. Therefore the former limits between European Russia and Asiatic were found to be somewhat incorrect, until the construction of the Novorossisk branch of the Vladikavkaz railroad, which became the principal port of the Northern Caucasus. In valuing the yearly turnover of Russian trade it is necessary to have in view, that the price of goods was fixed on the basis of the paper rouble, which is subject to considerable fluctuations in the rates of exchange; therefore, it is useful to mention, alongside of the former prices, the yearly totals in roubles gold, according to the rate of exchange of the given year, in order to be able to judge of the fluctuation in the turnover of trade during a longer period.

The yearly average import during eight five-year periods, from 1851 to 1890, was consecutively as follows: 74, 127, 138, 265, 427, 483, 480, 375 million paper roubles, or on the average, 294 millions; and in million roubles gold: 74, 120, 121, 212, 364, 326, 304, 224, or on the average, 218 millions.

In 1891 and 1892 the import did not exceed, in 1891, 326,000,000 paper, or 220,000,000 gold roubles; and in 1892, 347,000,000 paper, or 219,000,000 roubles gold. Thus it is seen that the paper rouble value of the import trade, having attained its highest limit during the five years, from 1876 to 1880, gradually decreases and falls to its minimum in 1891.

But the value of the export trade increased gradually until the nineties, as is seen from the following: the yearly average export during the eight five-year periods, from 1851 to 1890, was consecutively 81, 150, 161, 240, 356, 513, 546, 606 millions, or on the average, 332 million paper roubles, and in roubles gold: 81, 141, 140, 192, 303, 345, 346, 380 millions, or on the average 241 million roubles gold. In 1891 the export amounted to 627 millions paper, or 423 millions gold; and in 1891, 400 million paper, or 252 million roubles gold.

Such considerable fluctuations in the trade turnover can only be explained by examining a great number of different economic conditions of the Empire. According to information found in the reports on the foreign trade of Russia, it may be observed that the character of the commercial relations of Russia with other countries is very different from what it was in the middle of the century, and that Russian trade has attained great development. Thus, in 1851 the value of goods exported through the West European frontier was about 84,100,000, and in 1891 it amounted to 627,300,000 roubles paper; in other words, it increased seven and one-half times; moreover, the value of breadstuffs formed, in 1851, 25 per cent of the total export, and in 1891, 51 per cent. The percentage of the following goods increased in the total value of the export, as follows: forest goods, from 5 to 7 per cent; cow butter, from 0.1 to 1 per cent; fish and caviar, from 0.3 to 1 per cent. The export of some other goods has also increased, although the total value of the export has remained the same, for example: flax, from 3,000,000 pouds, in 1851, to 12,600,000 in 1891; hemp, from 3,000,000 to 3,900,000 pouds; wool, from 600,000 to 1,900,000 pouds: flax, and other seeds, from 10,100,000 to 23,700,000 pouds. Of special importance is the fact, that in 1891 such goods were exported which in 1851 were either imported, or did not form articles of the export trade, as, sugar, spirits, phosphorus, mercury, malt, all sorts of meat, oil, and naphtha products.

In close connection with the preceding is the decrease in the import of a great number of goods, especially of manufactured articles. In the total increase of the import, from 87,100,000, in 1851, to 326,300,000 roubles paper in 1891, increased also the relative import of: hemp, from 11 to 24 per cent; metals unwrought, from 2.3 to 7 per cent; articles in metal, including machines, from 5 to 10 per cent; wool, from 2 to 5 per cent. The import of cotton productions decreased from 2,000,000 to 1,300,000 paper roubles; and silk productions, from 4,000,000 to 1,200,000 paper roubles. The import of tea increased considerably, owing to the permission, in 1862, of bringing it through the European frontier. There was practically no export of tallow, iron, copper, and potash.

The general turnover of the foreign trade through the West European frontier averaged, from 1886 to 1890, 963,000,000 roubles paper, or 604,000,000 roubles gold, of which the export formed 606,000,000 roubles paper, or 380,000,000 roubles gold; and the import, 357,000,000 roubles paper, or 224,000,000 roubles gold, that is, a little more than one-third of the total turnover. The export exceeded the import by 249,000,000 roubles paper, or 156,000,000 roubles gold, that is, the import formed two-fifths of the export.

The different goods exported may be represented as follows: foodstuffs, 60 per cent; raw and half-wrought materials, 35 per cent; animals, 2 per cent; manufactures, 3 per cent. Goods were imported as follows: foodstuffs, 17 per cent; raw and half-wrought materials, 64 per cent; manufactures, 19 per cent.

The average export exceeded that of the import, from 1886 to 1890, in foodstuffs, by 305,000,000; in animals, by 11,000,000 paper roubles. The average import, on the contrary, exceeded that of the export, in raw and half-manufactured goods, by 16,000,000, and in manufactures, 51,000,000 roubles paper.

In 1891 the quantity of foodstuffs exported amounted to 381,100,000 roubles

paper; of raw and half-wrought materials, 209,800,000; of animals, 15,800,000; of manufactured articles, 20,600,000 roubles paper. The same year were imported: foodstuffs, 54,300,000 roubles worth; raw and half-wrought materials, 203,200,000; animals, 300,000, and manufactured articles, 68,40,0000 roubles paper. Thus, in 1891, notwithstanding the fluctuation in the figures, the relation between the different exports, as well as the imports, did not change materially as compared to that of the preceding five years, except that the export of raw materials exceeded their import as well as that of half-manufactured goods. Taken separately, the goods exported exceeded, on the average, the amount of those imported, as follows: foodstuffs, 309,000,000, and animals, 13,000,000 paper roubles; for half-manufactured materials the import was on the average greater than the export by 13 millions, and for manufactured articles, by 50,000,000 roubles paper. The latter difference was in 1886, 54,000,000; in 1887, 236,000,000; in 1888, 396,000,000; in 1889, 313,000,000; in 1890, 249,000,000; and in 1891, 301,000,000 roubles paper. From the above it is seen that the dependence of Russian trade on foreign import rapidly decreases.

The general turnover of the trade, that is, the total of the export and import through the West European frontier was on the average, from 1886 to 1890, 963,000,000 roubles paper, which were distributed on the separate parts of that frontier as follows: on the border of the White Sea, 1 per cent; the Baltic, 35 per cent; on the western overland frontier, 30 per cent; and on the southern border, 34 per cent. Thus, notwithstanding the special development of trade in Odessa, the Baltic frontier has until now a predominating importance to the foreign commerce of Russia. The trade balance in the separate parts of the West European frontier is not uniform: thus, on the White Sea border, the export exceeds, on the average, the import by 5,000,000; on the Baltic, by 16,000,000; on the western overland frontier, by 21,000,000; and on the southern, by 207,000,000 paper roubles. From the above it is seen that the southern frontier is of the greatest importance to the Russian trade balance.

By comparing the value of the export with that of the import in the different parts of the West European frontier the following results will be obtained: the import forms 17 per cent of the export over the White Sea border; 91 per cent, through the Baltic frontier; 87 per cent, on the western overland; 22 per cent, on the southern; in other words, on the White Sea and southern frontiers the export especially exceeds the import. These results are confirmed by the figures which show the total quantity of goods imported and exported through the different parts of the West European frontier. The export through the latter frontier, from 1886 to 1890, was 410, 557, 753, 690 and 639 million pouds; and the import, 206, 176, 184, 217, and 198 million pouds. The weight of goods imported through the White Sea frontier formed on the average, during the above mentioned five years, 7 per cent; through the Baltic, 58 per cent; through the western overland frontier, 42 per cent; and through the southern, 9 per cent of the exported goods.

From the above mentioned relations may be noted the following exceptions: the Baltic border, through which the import of cheap goods, such as coal, predominates; and the western overland frontier, through which valuable goods are imported.

The goods imported through the different parts of the West European frontier form the following per cent of the total: through the White Sea border,

1 per cent; the Baltic, 60 per cent; the western overland, 27 per cent; and the southern, 12 per cent. The quantity of exported goods is on the same frontiers as follows: 2, 33, 21 and 44 per cents respectively. From these figures it is seen that the weight of goods of the foreign trade, in the separate parts of the frontier, does not correspond with the value of those goods. In all these frontiers the quantity, as also the value of the export, exceed the import. This is largely due to the fact that the ships come into the Empire generally in ballast, and depart laden with cargoes, and that on the overland frontier a more intensive activity is observed in railways, going to the foreign frontier, than in those returning therefrom.

The annual totals of different goods imported, from 1883 to 1890, were as follows: herrings, 4,000,000 to 6,000,000 pouds; other foodstuffs, 7,000,000 to 20,000,000; coal and coke, 96,000,000 to 136,000,000; cotton, 6,000,000 to 10,000,000; cast-iron 4,000,000 to 19,000,000; iron, 3,000,000 to 6,000,000; other raw and half-wrought materials, 37,000,000 to 48,000,000; and manufactures, 7,000,000 to 13,000,000 pouds. The quantity of coal imported is the most considerable; with this exception, the weight of the other goods, imported from 1883 to 1890, fluctuated between 78,000,000 and 106,000,000 pouds, amounting on the average, during the 4 years from 1883 to 1886, to 96,500,000 pouds, and in the four-year period, from 1887 to 1890, to 85,250,000 pouds, that is, it decreased 12 per cent; this was influenced, among others causes, by the results of the Government tariff. The total weight of all the goods, exported from 1883 to 1890, fluctuated between 410,000,000 pouds, in 1886, to 753,000,000, in 1888; on the average during the 4 years, from 1883 to 1886, 483,000,000 pouds were exported, and the following four years, from 1887 to 1890, 660,000,000 pouds, that is, 27 per cent more.

Among exports cereals always occupied the first place, and formed, during the mentioned 4-year periods, on the average, 65 to 66 per cent, that is, about two-thirds of the total export; the second place was occupied by forest goods.

The principal articles imported, from 1886 to 1890, were of foodstuffs: groceries, 1,385,000 pouds, to the value of 29,993,000 roubles paper, of which tea forms 753,000 pouds, worth 19,330,000 roubles; coffee, 380,000 pouds, worth 5,134,000 roubles; tobacco, 65,000 pouds, worth 3,244,000 roubles; herrings and other fish, 6,254,000 pouds, to the value of 8,657,000 roubles; wine, 520,000 pouds, 7,623,000 roubles worth; vegetables and fruit, 2,594,000 pouds, valued at 6,805,000 roubles; cheese, 40,000 pouds, worth 702,000 roubles; rice, 158,000 pouds, 552,000 roubles worth; mineral waters, 144,000 pouds, 477,000 roubles worth; salt, 1,091,000 pouds, 372,000 roubles worth. Of raw and half-wrought materials: cotton, 8,162,000 pouds, 78,660,000 roubles worth; drugs, 5,515,000 pouds, 43,138,000 roubles worth; wool, 620,000 pouds, 20,454,000 roubles worth; coal and coke, 109,408,000 pouds, 13,064,000 roubles worth; cotton tissues, 230,000 pouds, 9,161,000 roubles worth; silk, 34,000 pouds, 8,978,000 roubles worth; iron, 3,921,000 pouds, 8,025,000 roubles worth; plants and grain, 2,064,000 pouds, 5,634,000 roubles worth; cast-iron, 8,353,000 pouds, 5,060,000 roubles worth; wrought leather, 96,000 pouds, 3,332,000 roubles worth; lead, 1,181,000 pouds, 2,781,000 roubles worth; forest goods to the value of 2,774,000 roubles; unmanufactured leather, 436,000 pouds, 2,611,000 roubles worth; steel, 710,000 pouds, 2,564,000 roubles worth. Of manufactured articles: machines and apparatus, 1,722,000 pouds, 16,263,000 roubles worth; iron and steel articles, 1,209,000 pouds, 11,044,000 roubles

worth; woollen, 39,000 pouds, 3,054,000 roubles worth; cotton, 32,000 pouds, 1,944,000 roubles worth; glass, 116,000 pouds, 1,748,000 roubles worth; silk, 4,000 pouds, 1,593,000 roubles worth; paper, 97,000 pouds, 1,210,000 roubles worth; cast-iron, 217,000 pouds, 936,000 roubles worth; faïence and china, 37,000 pouds, 663,000 roubles worth.

During the same years the principal articles of export were of foodstuffs: grain, 397,418,000 pouds, 322,434,000 roubles worth; sugar, 3,237,000 pouds, 12,159,000 roubles worth; eggs, 574,000,000 pieces, 9,403,000 roubles worth; spirits and corn-brandy 4,205,000 pouds, 7,418,000 roubles worth; fish and caviar, 650,000 pouds, 4,300,000 roubles worth; cow butter, 335,000 pouds, 3,458,000 roubles worth; different meats, 242,000 pouds, 1,287,000 roubles worth; tobacco, 128,000 pouds, 1,070,000 roubles worth; and papirosses, 21,000,000 pieces, 203,000 roubles worth. Of raw and half-manufactured materials: flax and tow, 11,549,000 pouds, 57,064,000 roubles; forest goods, to the value of 39,428,000 roubles; oil grain, 25,307,000 pouds, worth 32,800,000 roubles; hemp and tow, 3,685,000 pouds, 17,829,000 roubles worth; wool, 1,845,000 pouds, 17,590,000 roubles worth; bristles, 155,000 pouds, 8,504,000 roubles worth; leather, 450,000 pouds, 5,503,000 roubles worth; naphtha products, 4,964,000 pouds, 5,436,000 roubles worth; oil, 6,791,000 pouds, 5,143,000 roubles worth; and furs, 292,000 pouds, 4,496,000 roubles worth.

THE IMPORT AND EXPORT THROUGH THE PRINCIPAL CUSTOMHOUSES.

Owing to the great extent of the frontier, it is necessary to examine through which points the greatest quantity of goods has been transported. Investigations show that these points are such customhouses as are situated at the extreme points of the Russian railways.

St. Petersburg Seaport Customhouse: The value of the import by sea was during the consecutive years from 1886 to 1890 as follows: 59.1, 58.7, 59.5, 67.9, 72.3, or on the average, 63.5 million roubles, of which foodstuffs formed 16 per cent; raw and half-wrought materials, 70 per cent, and manufactures, 14 per cent. The value of the export by sea, during the same years, amounted consecutively to: 59, 55.3, 60.9, 58.2, 51.4, or on the average, 56.9 million roubles, of which, foodstuffs formed 59 per cent; raw and half-wrought material, 38 per cent; and manufactures, 3 per cent. The average import exceeds the export by 6,600,000 roubles; foodstuffs were exported to the value of 23,300,000 roubles more than the import; of raw and half-wrought materials the import exceeded the export by 22,900,000, and that of manufactures, by 7,000,000 roubles. The total weight of goods exported amounted on the average during the abovementioned years, to 53,100,000, and that of goods imported, to 74,200,000 pouds. Of foodstuffs the principal articles exported were: grain, 41,263,000 pouds; meat, 5,000 pouds; eggs, 30,000,000 pieces; cigarettes, 3,000,000 pieces. The articles imported were: cheese, 21,000; herrings and other fish, 594,000; groceries, 228,000; grape wine, 153,000; mineral waters, 40,000 pouds. Of raw and half-wrought materials were principally exported: lumber, to the value of 583,000 roubles; different grain, 3,355,000 pouds; oil, 1,074,000 pouds; flax and tow, 1,487,000; hemp and tow, 110,000; skins, 58,000; leather, 23,000; different

kinds of hair, 37,000; feathers and down, 14,000; wool unspun, 123,000; naphtha products, 1,148,000 pouds. The principal articles imported were: forest goods, to the value of 92,000 roubles; plants and the like, 410,000 pouds; different articles in wood, 94,000; unwrought leather, 116,000 pouds; wrought leather, 27,000; cotton, 1,161,000; cotton tissues, 45,000; wool, 17,000; cast-iron, 2,998,000; iron, 596,000; tin, 5,000; steel, 148,000; copper, 59,000; pewter, 54,000; lead, 724,000; zinc, 28,000; drugs, 4,091,000; coal and coke, 56,897,000 pouds. The principal manufactured articles imported were: earthenware and china, 5,000 pouds; glass, 33,000; farming implements, 7,000; cast-iron, 67,000; iron and steel, 133,000; machines and apparatus, 392,000; paper, 8,000; flax and hemp, 6,000; and wool, 4,000 pouds. The above mentioned data do not show the full turnover of the foreign trade in St. Petersburg; goods going by railway through the frontier are sent to the St. Petersburg inland customhouse to be examined; moreover, some of the goods, especially forest products, of the St. Petersburg port are sent to Cronstadt to be exported. The importance which St. Petersburg has for the trade of Finland will be mentioned in Section IV. Below are given data showing the turnover of the St. Petersburg inland customhouse.

St. Petersburg Inland Customhouse: The value of goods sent for inspection was consecutively, from 1886 to 1890, as follows: 11.4, 8.0, 9.4, 9.2, 9.7, or on the average, 9.5 million roubles, of which foodstuffs formed 30 per cent; raw and half-wrought materials, 31 per cent; and manufactured articles, 39 per cent. Foreign goods were principally transported to St. Petersburg for evaluating the duties through the following frontier customhouses: Virballen, 60 per cent; Odessa, 18; Reval, 13; Granitsa, 6; Radzivilov, 2; and Libau, 1 per cent. The principal foodstuffs imported were: vegetables and fruit, 23,000, and groceries, 45,000 pouds. Of the raw and half-wrought materials: cotton, 31,000 pouds; cotton tissues, 5,000; iron, 2,000; steel, 3,000; copper, 3,000; drugs, 25,000 pouds. Of the manufactured articles: glass goods, 3,000 pouds; iron and steel, 20,000; machines and apparatus, 40,000; paper, 4,000; woollen goods, 1,000; and cotton articles, 1,000 pouds.

Reval and Baltic Ports: The value of the import was from 1886 to 1890 consecutively: 53.9, 65.3, 43.7, 49.9, 54.4, or on the average 53.4 million roubles, of which foodstuffs formed 6 per cent; raw and half-wrought materials, 83 per cent; and manufactures, 11 per cent. The value of the export was during the same years as follows: 12.2, 25.7, 23.3, 18.7, 19.4 million roubles, or on the average 19.9 millions, of which foodstuffs formed 57 per cent; raw and half-wrought materials, 40 per cent; animals, 2 per cent; and manufactures, 1 per cent. The average import exceeded the export by 33,500,000 roubles; the export of foodstuffs was greater than the import by 8,200,000; of raw and half-wrought materials, on the contrary, the import exceeded the export by 36,300,000; the export of animals exceeded the import by 300,000; and of manufactures the import was greater than the export by 5,700,000 roubles.

The total weight of goods exported amounted, during the above years, to 15,600,000 pouds; and that of goods imported, to 8,900,000 pouds. The principal foodstuffs exported were: grain, 11,144,000 pouds; meat, 18,000; spirits, 1,260,000 pouds. The principal imports were: vegetables and fruit, 135,000 pouds; herrings and other fish, 317,000; groceries, 45,000; grape wine, 12,000 pouds. Of raw and half-wrought materials the principal articles of export were: lumber, to the value of

70,000 roubles; various seeds, 1,350,000 pouds; oil, 290,000; flax and tow, 1,140,000; hemp and tow, 62,000; different kinds of hair, 9,000; naphtha products, 123,000 pouds. The chief imports were: plants, 95,000 pouds; different kinds of lumber, 7,000; leather unwrought, 21,000; wrought leather, 13,000, cotton, 3,230,000; cotton tissues, 43,000; wool, 20,000; unwrought cast-iron, 151,000; iron, 162,000; steel, 68,000; copper, 13,000; pewter, 13,000; lead, 13,000; drugs, 370,000; and coal and coke, 3,348,000 pouds.

Of animals exported the principal were game, 667,000 pieces. Of manufactures imported the chief were: earthenware and china, 4,000 pouds; glass, 6,000; farming implements, 8,000; cast-iron, 11,000; iron and steel wares, 91,000; machines and apparatus, 250,000; paper, 3,000; flax and hemp, 8,000; woollen goods, 3,000 pouds, and cotton goods, 3,000 pouds.

Riga Customhouse: The value of the import for 1886 to 1890 inclusive, was successively as follows: 23,600,000; 20,700,000; 21,700,000; 20,800,000; 21,400,000 paper roubles, or on the average, 21,700,000 paper roubles; out of this number 16 per cent represented foodstuffs, 66 per cent raw and half-manufactured materials, and 18 per cent, finished wares. The value of the export for the same period amounted successively to 38,600,000; 52,300,000; 53,700,000; 51,200,000; 53,100,000 paper roubles, or on the average, to 49,800,000 paper roubles, distributed as follows: foodstuffs, 27 per cent; raw and half-manufactured materials, 73 per cent. The average value of the export exceeds that of the import by 28,100,000 paper roubles, this sum being distributed as follows: foodstuffs, 9,900,000, and raw and half-manufactured materials, 22,100,000 roubles paper; as to finished goods, their import exceeds the export by 3,900,000 roubles paper. The total weight of the goods exported for the years reviewed reached an average of 66,800,000 pouds; and that of goods imported, 20,700,000 pouds. Of the foodstuffs the principal articles of export were: grain, 16,892,000 pouds; meat, 7,000 pouds; and eggs, 63,000,000 pieces. The principal articles of import were, vegetables and fruit, 128,000 pouds; herrings and other fish, 659,000 pouds; colonial wares, 47,000 pouds; grape wine, 31,000 pouds; and mineral waters, 4,000 pouds. Of raw and half-manufactured materials the principal exports were: lumber, to the value of 11,302,000 paper roubles; various seeds, 4,413,000 pouds; seed residues, 1,462,000 pouds; flax and tow, 2,775,000 pouds; hemp and tow, 826,000 pouds; skins, 14,000 pouds; hides, 96,000 pouds; hair of all kinds, 24,000 pouds; wool unspun, 162,000 pouds; naphtha products, 344,000 pouds. The import of such materials was: lumber, to the value of 18,000 paper roubles; plants and the like, 353,000 pouds: wood of various kinds, 5,000 pouds; raw hides, 18,000 pouds; tanned leather, 7,000 pouds; cotton, 135 pouds; cotton yarn, 8,000 pouds; unwrought cast-iron, 1,412,000 pouds; iron, 440,000 pouds; steel, 216,000 pouds; lead, 26,000 pouds; drugs, 1,929,000 pouds; coal and coke, 10,352,000 pouds. Of the finished wares the principal imports were: faïence and porcelain, 2,000 pouds; glass, 3,000 pouds; agricultural implements, 48,000 pouds; wrought cast-iron, 8,000 pouds; iron and steel, 66,000 pouds; machinery and apparatus, 133,000 pouds; paper 3,000 pouds; flax and hemp goods, 2,000 pouds; and woollens, 3,000 pouds.

Libau Customhouse: The value of the import for 1886 to 1890 inclusive was successively as follows: 13,100,000; 11,300,000; 24,300,000; 30,000,000; 18,700,000 paper roubles, or on the average, 19,500,000 paper roubles, out of which 13 per cent

fell to foodstuffs, 73 per cent, to raw and half-manufactured materials, and 14 per cent to finished goods.

The value of the export for the given period was successively as follows: 25,300,000; 31,900,000; 51,000,000; 46,500,000; 38,300,000 roubles paper, or on the average, 38,600,000 roubles paper distributed in kind of wares as follows: foodstuffs, 63 per cent; raw and half-manufactured materials, 36 per cent; and animals, 1 per cent. The export exceeded the import, on the average, by 19,100,000 paper roubles; the export of foodstuffs exceeded the import thereof by 21,600,000 paper roubles; while the import of finished wares exceeded the export thereof by 2,500,000 paper roubles. The export value of the materials was on the average equal to that of the import. The average total weight of the goods exported during the given period reached 40,900,000 pouds, and that of the goods imported, only 9,200,000 pouds.

Of the foodstuffs exported the principal were: grain, 32,834,000 pouds; meat, 43,000 pouds; eggs, 25,000,000 pieces; and alcohol, 730,000 pouds. Of those imported the principal were: vegetables and fruit, 24,000 pouds; cheese, 4,000 pouds; herrings and other fish, 1,210,000 pouds; colonial wares, 40,000 pouds; grape wine, 11,000 pouds; and mineral waters, 20,000 pouds.

Of the raw and half-manufactured materials the principal exports were: lumber, to the value of 285,000 paper roubles; all kinds of seeds, 2,484,000 pouds; seed residues, 1,077,000 pouds; flax and tow, 788,000 pouds; hemp and tow, 114,000 pouds; various skins, 74,000 pouds; different hides, 61,000 pouds; all kinds of hair, 50,000 pouds; wool unspun, 206,000 pouds; naphtha products, 1,016,000 pouds. The principal imports of such materials were: plants and the like, 348,000 pouds; raw hides, 16,000 pouds; tanned leather, 9,000 pouds; cotton, 639,000 pouds; cotton yarn, 10,000 pouds; unwrought cast-iron, 383,000 pouds; all sorts of iron, 166,000 pouds; steel, 59,000 pouds; brass, 6,000 pouds; tin, 12,000 pouds; lead, 23,000 pouds; zinc, 7,000 pouds; drus, 876,000 pouds; coal and coke, 3,535,000 pouds; of animals the principal article of export was game, 261,000 pieces. Of the finished wares the principal imports were: farming implements, 38,000 pouds; wrought cast-iron, 12,000 pouds; iron and steel wares, 63,000 pouds; machinery and apparatus, 78,000 pouds; flax and hemp goods, 14,000 pouds.

Odessa Customhouse: The value of the import for 1886 to 1890 inclusive was successively as follows: 66,100,000; 39,600,000; 43,700,000; 45,900,000; 49,100,000 roubles paper, or on the average, 48,800,000 roubles paper, out of which 40 per cent fell to foodstuffs; 50 per cent, to raw and half-wrought materials; and 10 per cent, to finished wares.

The value of the export during the same period was successively as follows: 88,200,000; 122,900,000; 162,200,000; 159,400,000; 126,500,000 roubles paper, or on the average 131,800,000 roubles, distributed as follows: foodstuffs, 80 per cent; raw and half-manufactured materials, 11 per cent; animals, 2 per cent; and finished wares, 7 per cent. The export exceeded the import on the average by 83,000,000 roubles; the export exceeded the import of foodstuffs by 86,000,000 roubles; of animals by, 2,800,000 roubles paper; of finished wares, by 4,800,000 roubles; while the import of raw and half-manufactured materials exceeded the export by 10,600,000 roubles paper. The total weight of the goods exported during this period reached on the average 104,900,000 pouds, while that of the goods imported was 18,800,000 pouds.

Of foodstuffs the principal exports were: grain, 90,661,000 pouds; meat, 23,000 pouds; fish, 216,000; sugar, 3,098,000 pouds; cigarettes, 8,000,000 pieces; alcohol, 900,000 pouds; and the principal imports were: vegetables and fruit, 907,000 pouds; cheese, 5,000 pouds; herrings and other fish, 23,000 pouds; colonial wares, 466,000 pouds; grape wine, 21,000 pouds; mineral waters, 18,000 pouds.

Of raw and half-manufactured materials the following were chiefly exported: lumber, to the value of 1,050,000 roubles paper; different seeds, 2,971,000 pouds; seed residues, 393,000 pouds; hemp and tow, 12,000 pouds; unspun wool 382,000 pouds; naphtha products, 57,000 pouds; the principal imports of such materials were: lumber to the value of 26,000 paper roubles; plants and the like, 310,000 pouds; wood of various kinds, 7,000 pouds; hides untanned, 40,000 pouds; cotton, 1,423,000 pouds; cotton yarn, 18,000 pouds; unwrought cast-iron, 122,000 pouds; iron, 670,000 pouds; steel, 54,000 pouds; tin, 14,000 pouds; lead, 144,000 pouds; drugs, 1,206,000 pouds; coal and coke, 10,208,000 pouds. Of the animals exported the principal were fowls, 224,000 pieces. The principal finished wares imported were: porcelain and faïence, 9,000 pouds; glass 25,000 pouds; agricultural implements, 61,000 pouds; wrought cast-iron, 36,000 pouds; iron and steel wares, 124,000 pouds; machinery and apparatus, 92,000 pouds; paper wares, 10,000 pouds; and flax and hemp goods, 138,000 pouds.

Moscow Customhouse: The value of the goods brought for examination to the customhouse from 1886 to 1890 inclusive was successively as follows: 66,700,000; 48,800,000; 58,200,000; 67,900,000; 56,900,000 roubles paper; or on the average, 57,700,000 roubles, distributed as follows: foodstuffs, 33 per cent; raw and half-manufactured materials, 50 per cent; and finished wares, 17 per cent.

The import was chiefly through the frontier customhouses; 29 per cent of the total value of import fell to Graevo; 19 per cent, to Odessa; 17 per cent, to Virballen; 15 per cent, to Alexandrovo; 8 per cent, to St. Petersburg; 4 per cent, to Reval; 3 per cent, to Granitsa; 2 per cent, to Radzivilov; to Libau, Sosnovitsi and Riga, 1 per cent each.

Of the foodstuffs the principal imported were: vegetables and fruit, 7,000 pouds; cheese, 12,000 pouds; colonial wares, 688,000 pouds, among them, 673,000 pouds of tea; grape wine, 88,000 pouds. Of raw and half-manufactured materials the principal imports were: hides untanned, 3,000 pouds; tanned leather, 25,000 pouds; pelts, 9,000 pouds; cotton, 24,000 pouds; cotton yarn, 88,000 pouds; silk, 19,000 pouds; wool, 95,000 pouds; iron, 88,000 pouds; steel, 15,000 pouds; brass, 18,000 pouds; drugs, 147,000 pouds. The principal imported finished wares were: faïence and porcelain, 4,000 pouds; glass, 8,000 pouds; agricultural implements, 7,000 pouds; wrought cast-iron, 10,000 pouds; iron and steel wares, 103,000 pouds; machinery and apparatus, 137,000 pouds; paper wares, 9,000 pouds; flax and hemp goods, 10,000 pouds; woollen goods, 8,000 pouds; and cotton goods, 5,000 pouds.

Warsaw Customhouse: The value of the goods brought for examination from 1886 to 1890 inclusive was successively as follows: 12,000,000; 10,900,000; 18,600,000; 22,300,000; 19,800,000 paper roubles, or on the average, 16,700,000 paper roubles, out of which 18 per cent fell to foodstuffs; 46 per cent to raw and half-wrought materials; and 36 per cent, to finished goods. The imports to Warsaw were chiefly through the following frontier customhouses: Alexandrovo, 53 per cent of the total import value; Mlava, 17 per cent; Odessa, 13 per cent; Granitsa, 9 per cent; Sosnovitsa, 6 per cent; and through all others, 2 per cent.

The principal foodstuffs imported were: vegetables and fruit, 96,000 pouds; herrings and other fish, 147,000 pouds; colonial wares, 55,000 pouds; grape wine, 45,000 pouds; mineral waters, 12,000 pouds. Of the raw and half-manufactured materials the principal imports were: plants and seeds, 27,000 pouds; all kinds of wood, 12,000 pouds; hides untanned, 74,000 pouds; tanned leather 8,000 pouds; cotton, 270,000 pouds; cotton yarn, 36,000 pouds; wool, 7,000 pouds; unwrought cast-iron, 38,000 pouds; iron, 67,000 pouds; steel, 88,000 pouds; drugs, 175,000 pouds. Of the finished wares the principal imports were: faïence and porcelain, 6,000 pouds; agricultural implements, 29,000 pouds; wrought cast-iron, 15,000 pouds; iron and steel, 143,000 pouds; machinery and apparatus, 50,000 pouds; paper, 5,000 pouds; flax and hemp goods, 6,000 pouds; and cotton goods, 5,000 pouds.

DISTRIBUTION OF GOODS BY COUNTRIES.

The distribution of goods by the separate foreign countries, according to the import and export, and the computation of the turnover with regard to different countries, are two problems not easily solved with the present unsatisfactory state of the international statistics. In despatching goods the shipper is not always able to declare their point of destination, as after the lading, and even in transit to a given point, the goods may be ordered to another destination without the knowledge of the despatch customhouse, as is often the case, when they are resold by large agencies.

With regard to the denomination of the country whence the goods come, the fact must be remembered that the wares sent to Russia are often accompanied by documents, written when the goods were already on their way, and given out on relading or repacking, as in cases of transshipment due to the lack of direct means of communication, et cetera; thus, valuable wares coming from Switzerland and France are most often necessarily reckoned as coming from Germany, as they are brought in collected lots by German forwarding agents. Regardless of the direct profit the latter derive from the cost of the transport, and the reducing of the so-called waybill expenses, this method of depriving the goods of their individuality answers to the interests of the receivers, who generally try their utmost to keep secret the place whence their goods are imported.

Besides these cases of absolutely false data, the statistics of the international trade have to reckon with the notable fact of the existence of special centres for the principal goods, whither they are brought from the places of their production, and whence, after their sorting, classification, et cetera, they are sent to the places of their consumption; thus, the wares are not coming by the shortest way from the places of their production to those of their consumption, but, according to their different kinds, are subject to the law of gravitation towards definite centres. The further development of the international trade tends to decentralization, dependent upon the acquirement of a more thorough knowledge of the technical side of the trade by the producers, as well as by the consumers; only few goods, however, have attained this stage; for most of the articles of the large international trade the tending towards the centralization of goods and bargains in large trade centres is still very considerable.

It results, therefore, that in order to obtain an exact knowledge of the direction and the amount of trade returns, it would be necessary to investigate each separate article over the whole world; or, that all the principal countries should agree to take measures for the registration, according to a special program, of the most important data referring to the international trade in general, or at least to that of the principal articles.

With regard to the distribution of the import and export accross the European frontier to different countries, it is necessary to bear in mind that, when the export through the southern ports is shown, as ships of the Union Jack predominate, Great Britain is chiefly marked as the point of destination, although the discharging is done in the ports of the Mediterranean Sea, of the Atlantic Ocean, and even of the North Sea as well; besides, it happens that the goods are marked as if exported to Turkey, while in reality they are only transhipped in Constantinople; the same is true with regard to wares marked in the reports of the Baltic ports as exported to Denmark, while they are only transhipped there.

Relative to the export by land, the Russian statistics are not able to state what part of the goods is destined for an uninterrupted transit through the neighbouring countries, and more especially to state what part is to be transit goods after passing through the depots. On the other hand, the data of the import exaggerate the share of the neighbouring countries at the expense of those more distant. Although the existing figures do not state very exactly which foreign countries are engaged in the import of their wares to Russia, and to which Russia exports its goods, nevertheless they present a material which can be of some use in showing the dimensions of the trade relations, including herein all kinds of commission business, transport agencies, et cetera.

It can be seen from the above that the data referring to the trade between two countries as given in their returns are not expected always to correspond. On the average, the value of the import across the European frontier for the period 1886 to 1890 is distributed among separate foreign countries as follows: From Germany, 34.1 per cent; from Great Britain, 26.8 per cent; from the United States of America, 10.9 per cent; from Austro-Hungaria, 4.4 per cent; from France, 4.1 per cent; from Turkey, 2.3 per cent; from Italy, 2.1 per cent; from Belgium, 2 per cent; from the Netherlands, 1.2 per cent; and from other countries, 12.1 per cent. Correspondingly, the export is as follows: To Great Britain, 34.7 per cent; to Germany, 27 per cent; to the Netherlands, 7.3 per cent; to France 6.3 per cent; to Italy, 4.6 per cent; to Austro-Hungaria, 4.1 per cent; to Belgium, 3.9 per cent; to Turkey, 2.2 per cent; to Sweden, 1.7 per cent; to Denmark, 1.5 per cent; to Greece, 1.3 per cent; and to other countries, 5.4 per cent.

Out of the total value of the turnover, import as well as export, reaching an average of 963,000,000 roubles paper during the period from 1886 to 1890, 31.7 per cent fell to the trade with Great Britain; 29.6 per cent, to Germany; 5.5 per cent, to France; 5 per cent, to the Netherlands; 4.3 per cent, to Austro-Hungary; 4.1 per cent, to the United States of America; 3.6 per cent, to Italy; 3.2 per cent, to Belgium; 2.2 per cent, to Turkey; 1.3 per cent, to Sweden; 1.2 per cent, to Denmark; 1 per cent, to Greece; 0.8 per cent, to Norway; 0.7 per cent, to Roumania; 0.7 per cent, to Spain; 0.2 per cent, to Portugal; and 4.9 per cent, to other countries.

In the same order, data referring to separate countries are given below, to characterize the trade relations of Russia with such countries.

Great Britain: The value of the import for the period 1886 to 1890 inclusive was successively as follows: 108,000,000; 91,600,000; 96,000,000; 95,900,000; 86,700,000 roubles paper, or on the average 95,600,000 roubles; out of which 14 per cent fell to foodstuffs; 67 per cent to raw and half-wrought materials; and 19 per cent to finished wares. The value of the export for the same period was successively as follows: 139,900,000; 182,300,000; 287,700,000; 257,600,000; 191,900,000 roubles paper, or on the average 210,000,000 roubles; out of which 67 per cent fell to foodstuffs, and 33 per cent to raw and half-wrought materials.

The export exceeded the import on the average by 114,500,000 paper roubles. With regard to the kind of wares, the difference between the figures of import and of export averaged as follows: the export of foodstuffs exceeded the import by 126,500,000 roubles paper; that of raw and half-wrought materials exceeded the import by 4,500,000 roubles paper; while the import of finished wares exceeded their export by 17,100,000 roubles paper.

Of the foodstuffs the principal exports were: grain 588,056,000 pouds; sugar, 1,739,000 pouds; alcohol, 81,000 pouds; eggs, 73,000,000 pieces; all kinds of meat, 39,000,000 pouds. Of those imported the principal were: fish, and especially herrings, 1,792,000 pouds; colonial wares, 470,000 pouds, including 241,000 pouds of tea, and 141,000 pouds of coffee.

The principal raw and half-wrought materials exported were: lumber, to the value of 15,948,000 paper roubles; linseed, hempseed, rape seed, and other seeds, 12,645,000 pouds; seed residues, 1,728,000 pouds; flax, combed flax, and tow, 4,086,000 pouds; wool unspun, 1,158,000 pouds; hemp and hemp tow, 703,000 pouds; pelts 655,000 pouds; flax and hemp yarn, 108,000 pouds; naphtha and its products, 384,000 pouds; different kinds of hair, 69,000 pouds; different hides, 54,000 pouds. The principal raw and half-wrought materials imported were: coal and coke, 89,757,000 pouds; cast-iron, 5,439,000 pouds; drug wares, 3,227,000 pouds; cotton, 1,673,000 pouds; iron, 852,000 pouds; plants and the like, 629,000 pouds; lead, 550,000 pouds; steel, 202,000 pouds; cotton yarn, 154,000 pouds; tin, 73,000 pouds; brass, 62,000 pouds; hides untanned, and tanned leather, 60,000 pouds; and wool, 58,000 pouds. The principal animals exported were: live fowls and slaughtered game, 798,000 pieces. The principal finished goods imported were: machinery and apparatus, 865,000 pouds; iron and steel wares, 410,000 poud; flax and hemp goods, 159,000 pouds; articles of husbandry, 128,000 pouds; and wrought cast-iron, 115,000 pouds.

Germany: The value of the import from 1886 to 1890 inclusive reached successively: 135,200,000; 112,500,000; 122,300,000; 124,100,000; 114,300,000 roubles paper, or on the average 121,700,000 roubles; out of this figure, 11 per cent fell to foodstuffs, 61 per cent to raw and half-wrought materials, and 28 per cent to finished goods. The value of the export for the same period was successively as follows: 118,600,000; 151,700,000; 181,600,000; 190,400,000; 176,500,000 roubles paper, or on the average 163,700,000 roubles, out of which, foodstuffs furnished, 37 per cent; raw and half-wrought materials, 56 per cent; animals, 4 per cent; and finished wares, 3 per cent.

The total export exceeded the import by 42,000,000 roubles paper; on the aver-

age, the difference between the figures according to the various goods averaging as follows: the export exceeded the import of foodstuffs by 46,500,000 roubles paper; that of raw and half-wrought materials by 18,300,000 roubles paper; of animals by 6,700,000 roubles paper; on the contrary the import of finished goods exceeded their export by 29,500,000 roubles paper.

The principal foodstuffs exported were: grain, 58,381,000 pouds; alcohol and corn brandy, 2,616,000 pouds; potatoes, 1,365,000 pouds; sugar, 378,000 pouds; eggs, 235,035,000 pieces; and cigarettes, 12,625,000 pouds. The principal foodstuffs imported were: herrings and other fish, 996,000 pouds; vegetables and fruits, 386,000 pouds; salt, 509,000 pouds; colonial wares, 345,000 pouds; grain supplies, 248,000 pouds, including 83,000 pouds of rice; grape wine, 108,000 pouds; mineral waters, 70,000 pouds; and cheese, 28,000 pouds.

The principal raw and half-wrought materials exported were: lumber, to the value of 15,508,000 paper roubles; seeds, 4,774,000 pouds; flax, 4,366,000 pouds; hemp, 2,523,000 pouds; seed residues, 2,446,000 pouds; naphtha products, 1,829,000 pouds; hides, 249,000 pouds; wool unspun, 222,000 pouds; skins, 197,000 pouds; bristles, 113,000 pouds; feathers, 59,000 pouds. The same materials imported were: coal and coke, 16,900,000 pouds; drug wares, 2,693,000 pouds; cast-iron, 2,015,000 pouds; iron, 1,797,000 pouds; cotton, 1,140,000 pouds; plants and the like, 695,000 pouds; lead, 450,000 pouds; wool, 361,000 pouds; steel, 312,000 pouds; hides untanned, 226,000 pouds; zinc, 146,000 pouds; all kinds of wood, 91,000 pouds; cotton yarn, 71,000 pouds; brass, 63,000 pouds; tanned leather, 58,000 pouds; silk, 20,000 pouds; pelts, 18,000 pouds; and tin, 14,000 pouds. The principal animals exported were: domestic fowls, 2,588,000 pieces; game, 956,000 pieces; and horses, 25,000 head.

The principal finished wares imported were: machinery and apparatus, 657,000 pouds; iron and steel goods, 286,000 pouds; implements of husbandry, 206,000 pouds; wrought cast-iron, 78,000 pouds; paper wares, 63,000 pouds; glass goods, 36,000 pouds; flaxen and hempen articles, 29,000 pouds; woollen, 27,000 pouds; cotton goods, 21,000 pouds; porcelain and faïence, 15,000 pouds; perfumery and cosmetics, 7,000 pouds; and silken stuffs, 2,000 pouds.

France: The value of the import from 1886 to 1890 inclusive reached successively: 11,500,000; 13,200,000; 13,200,000; 18,400,000; 16,200,000 roubles paper, or on the average, 14,500,000 roubles, distributed as follows: for foodstuffs, 29 per cent; for raw and half-wrought materials, 46 per cent; for finished wares, 25 per cent. The value of the export for the same period equalled successively: 24,600,000; 35,900,000; 52,800,000; 35,200,000; 41,800,000 roubles paper, or on the average 38,100,000 paper roubles, out of which 66 per cent fell to foodstuffs; 33 per cent to raw and half-wrought materials; and one per cent to animals.

The total export exceeds the total import on the average by 23,600,000 roubles paper, the difference in the figures with regard to the kinds of goods averaging as follows: the export exceeded the import of foodstuffs by 21,100,000 roubles paper; that of raw and half-wrought materials, by 5,700,000 roubles paper; of animals, by 200,000 roubles; on the contrary the import of finished goods exceeded the export thereof by 3,500,000 roubles. The principal foodstuffs exported were: grain, 27,017,000 pouds; and alcohol, 322,000 pouds; those imported:

grape wine, 140,000 pouds; herrings and other fish, 32,000 pouds; vegetables and fruit, 22,000 pouds; colonial wares, 12,000 pouds; mineral waters, 8,000 pouds; and cheese, 3,000 pouds.

The principal raw and half-wrought materials exported were: flax and flax tow, 1,480,000 pouds; different kinds of seeds, 1,099,000 pouds; seed residues, 266,000 pouds; wool unspun, 149,000 pouds; hemp and hemp tow, 79,000 pouds; naphtha and its products, 61,000 pouds; pelts, 14,000 pouds; hides, 12,000 pouds; lumber to the value of 2,402,000 roubles. The principal of such materials imported were: drug and chemical products 740,000 pouds; cotton, 88,000 pouds; lead, 86,000 pouds; hides not tanned, 15,000 pouds; plants and the like, 13,000 pouds; wool, 11,000 pouds; silk, 6,000 pouds; lumber, to the value of 24,000 roubles. The principal animals exported were: live domestic fowls, 93,000 pieces. Of the finished goods the principal imported were: machinery and apparatus, 18,000 pouds; iron and steel wares, 18,000 pouds; faïence and porcelain goods, 7,000 pouds; flaxen and hempen wares, 6,000 pouds; glass wares, 4,000 pouds; paper goods 4,000 pouds; woollen goods, 2,000 pouds; cosmetics and perfumery, 2,000 pouds.

Netherlands: The value of the import reached in the period from 1886 to 1890 inclusive successively: 4,000,000; 3,700,000; 4,600,000; 4,400,000; 4,900,000 roubles, or on the average 4,300,000 roubles paper, distributed as follows: foodstuffs, 28 per cent; raw and half-wrought materials, 64 per cent; finished goods, 8 per cent. The value of the export for the same period equalled successively: 36,300,000; 45,900,000; 52,900,000; 45,500,000; 40,000,000 roubles paper, or an average of 44,100,000 roubles, of which 80 per cent fell to foodstuffs, and 20 per cent to raw and half-wrought materials.

The total export exceed the total import on the average by 39,800,000 roubles; according to the class of wares, the difference between the figures of export and import averaged as follows: the export exceeded the import of foodstuffs by 33,800,000 roubles; that of the raw and half-wrought materials, by 6,300,000 roubles; on the contrary, the import of finished goods exceeded the export thereof by 300,000 roubles. The principal foodstuffs exported were: grain, 42,732,000 pouds; eggs, 3,755,000 pieces; and cigarettes, 1,114,000 pieces; those imported: fish and herrings, 131,000 pouds; and colonial wares, 21,000 pouds.

The principal raw and half-wrought materials exported were: lumber, to the value of 2,335,000 paper roubles; seeds, 3,729,000 pouds; naphtha and its products, 392,000 pouds; flax, combed flax and tow, 145,000 pouds; hemp, 55,000 pouds; seed residues, 41,000 pouds; the principal raw and half-wrought materials imported were: cast iron, 281,000 pouds; drug wares, 174,000 pouds; iron, 162,000 pouds; steel, 51,000 pouds; plants and the like, 40,000 pouds; tin, 24,000 pouds; and lead; 22,000 pouds. Of the finished goods the principal imported were iron and steel wares, 12,000 pouds.

Austro-Hungary: The value of the import for 1886 to 1890 inclusive reached successively: 16,600,000; 12,400,000; 14,600,000; 18,400,000; 17,300,000 roubles, or an average of 15,900,000 roubles distributed, as follows: foodstuffs, 13 per cent; raw and half-wrought materials, 49 per cent; animals, one per cent; finished wares, 37 per cent. The export value for the same period was successively as follows: 23,900,000; 24,000,000; 23,500,000; 27,600,000; 26,900,000 roubles paper, or 25,200,000

roubles on the average, out of which 55 per cent fell to foodstuffs, 37 per cent to raw and half-wrought materials; 5 per cent to animals; and 3 per cent to finished goods.

The total export exceeded the total import on the average by 9,300,000 roubles; and in the former foodstuffs and raw and half-wrought materials predominate, while in the latter finished goods are of first importance. According to the class of wares the difference between the figures of export and import averages as follows: the export exceeds the import of foodstuffs by 11,600,000 roubles; that of the raw and half-wrought materials, by 1,600,000 roubles; of animals, by 1,200,000 roubles; the import of finished goods exceeds, on the contrary, the export there by 5,100,000 roubles.

The principal foodstuffs exported were: grain, 9,670,000 pouds; potatoes, 405,000 pouds; eggs, 254,000,000 pieces; sugar, 82,000 pouds; tobacco, 70,000 pouds; and cigarettes, 1,000,000 pieces; those imported: kitchen salt, 148,000 pouds; vegetables and fruit, 72,000 pouds; colonial wares, 20,000 pouds; grape wine, 50,000 pouds; and mineral waters, 37,000 pouds.

The principal raw and half-wrought materials exported were; lumber, to the value of 480,000 roubles; seeds, 434,000 pouds; seed residues, 20,000 pouds; flax and combed flax, 218,000 pouds; hemp and tow, 101,000 pouds; skins, 12,000 pouds; pelts, 62,000 pouds; manes and horse tails, 24,000 pouds; bristles, 16,000 pouds; down and feathers, 39,000 pouds; wool unspun, 191,000 pouds; and naphtha products, 1,292,000 pouds. The same materials imported were: plants and the like, 140,000 pouds; cast-iron, 220,000 pouds; iron, 105,000 pouds; drugs, 290,000 pouds; coal and coke, 2,263,000 pouds; ozocerite, 126,000 pouds; ceresin, 12,000 pouds; and lumber, to the value of 2,330,000 roubles paper. The principal animals exported were: live fowls, 215,000 pieces; rams and sheep, 85,000 head; and horses, 3,000 head. Of finished goods the principal imported were: glass wares, 30,000 pouds; agricultural implements, 65,000 pouds; iron, steel and cast-iron wares, 161,000 pouds; machinery and apparatus, 188,000 pouds; and paper goods, 22,000 pouds.

United States of America: The value of the import reached for the period of from 1886 to 1890 inclusive successively: 26,800,000; 41,900,000; 20,800,000; 50,700,000; 53,400,000 roubles paper, or an average of 38,700,000 roubles, distributed as follows: raw and half-manufactured materials, 99 per cent; finished goods, one per cent. The export value for the same period was successively as follows: 300,000; 0; 0; 1,200,000; 400,000 paper roubles; or on the average 400,000 paper roubles, out of which 54 per cent fell to foodstuffs; 44 per cent to half-manufactured materials; and one per cent to animals and finished goods.

The total import exceeded the total export on the average by 38,700,000 roubles, the difference between the import and export figures averaging as follows: the import exceeded the export of raw and half-manufactured materials by 38,200,000 roubles; of finished wares, by 200,000 roubles; while the export of foodstuffs exceeds the import thereof by 100,000 roubles. Of the foodstuffs wheat was chiefly exported, 104,000 pouds.

The principal exports of raw and half-manufactured materials were: wool unspun, 16,000 pouds; the principal imports thereof: cotton, 3,664,000 pouds; white resin, 901,000 pouds; dye wood, 606,000 pouds; leather untanned, 93,000 pouds;

plants and the like, 50,000 pouds; jute, 40,000 pouds; and lead, 5,000 pouds. Of the finished goods implements of husbandry were chiefly imported, 30,000 pouds.

Turkey: The import value from 1886 to 1890 inclusive was successively as follows: 16,100,000; 5,900,000; 4,800,000; 6,600,000; 7,100,000 roubles paper, or on the average 8,100,000 roubles; out of this 68 per cent fell to foodstuffs, 27 per cent to raw and half-manufactured materials; and 5 per cent to finished goods. The export value for the same period equalled successively: 11,300,000; 15,400,000; 17,400,000; 12,500,000; 10,600,000 roubles paper, or an average of 13,400,000 roubles, distributed as follows: foodstuffs, 67 per cent; raw and half-manufactured goods, 13 per cent; animals, 10 per cent; and finished wares, 10 per cent. The average value of the total export exceeded that of the import by 5,300,000 roubles paper; the average difference between the figures of import and export with regard to the class of wares being: the export exceeds the import of foodstuffs by 3,500,000 roubles; that of animals, by 1,300,000 by roubles; of finished goods, by 1,000,000 roubles; while the import of raw and half-manufactured goods exceeds their export by 400,000 roubles.

Of the foodstuffs the principal exports were: grain, 4,033,000 pouds; alcohol, 2,696,000 pouds; butter, 135,000 pouds; sugar, 124,000 pouds; all kinds of caviar, 116,000 pouds; fish, 28,000 pouds; the principal imports: vegetables and fruit, 1,132,000 pouds; colonial wares, 90,000 pouds, including 70,000 pouds of tobacco; breadstuffs, 15,000 pouds; and wine, 14,000 pouds.

Of the raw and half-manufactured materials the principal exports were: lumber, to the value of 571,000 roubles paper; tallow, 126,000 pouds; hides, 26,000 pouds; and wool unspun, 10,000 pouds; and the principal imports: drugs, 156,000 pouds; including 123,000 pouds olive oil; plants and the like, 78,000 pouds; cotton, 32,000 pouds; raw hides, 7,000 pouds; and lumber, to the value of 50,000 roubles. The principal animals exported were: rams and sheep, 59,000 head; oxen and cows, 12,000 head. Of the finished wares the principal imports were: iron and steel goods, 3,000 pouds.

Sweden: The value of the import for 1886 to 1890 inclusive was successively as follows: 2,400,000; 1,200,000; 2,400,000; 2,700,000; 3,900,000 roubles, or on the average 2,500,000 roubles; out of this number 31 per cent fell to foodstuffs; 37 per cent, to raw and half-manufactured goods; and 32 per cent, to finished wares. The export value for the same period equalled successively: 9,800,000; 11,100,000; 11,100,000; 9,100,000; 10,200,000 roubles, or an average of 10,300,000 roubles, distributed as follows; foodstuffs, 83 per cent; raw and half-manufactured materials, 16 per cent; finished goods, one per cent.

The average export exceeded the import by 7,800,000 roubles, the difference of the figures with regard to various classes of wares averaging as follows: the export exceeded the import for foodstuffs by 7,700,000, for raw and half-manufactured goods by 800,000 roubles; while the import of finished goods exceeded the export thereof by 700,000 paper roubles.

The principal foodstuffs exported were: grain, 9,550,000 pouds; and alcohol, 3,787,0000 pouds; those imported: herring and other fish, 553,000 pouds; and breadstuffs, 13,000 pouds. Of raw and half-munufactured goods the principal exports were: lumber, to the value of 176,000 roubles; seed residues, 342,000 pouds; various seeds,

330,000 pouds; naphtha and its products, 291,000 pouds; flax and flax tow, 39,000 pouds; hemp and hemp tow, 39,000 pouds; the principal imports were: coal and coke, 251,000 pouds; cast-iron, 208,000 pouds; iron, 152,000 pouds; dye clays, 141,000 pouds; and steel, 15,000 pouds. The principal finished goods imported were: carpenters and coopers wares, 33,000 pouds; machinery and apparatus, 4,000 pouds; and iron and steel wares, wrought cast-iron, and farming implements, 3,000 pouds each.

Denmark: The value of the import for 1886 to 1890 inclusive reached successively: 1,200,000; 3,800,000; 2,100,000; 1,500,000; 1,600,000 roubles, or an average of 2,000,000 paper roubles; out of this number 20 per cent fell to foodstuffs; 66 per cent, to raw and half-manufactured goods; and 14 per cent, to finished wares. The export value for the same period was successively: 5,300,000; 7,700,000; 12,300,000; 11,600,000; 8,300,000 roubles, or on the average, 9,000,000 roubles, distributed as follows: foodstuffs, 63 per cent; raw and half-manufactured goods, 36 per cent; finished wares, one per cent.

The average total export exceeded the import by 7,000,000 roubles paper; with regard to the class of wares the difference in the figures averaged as follows: the export exceeded the import for foodstuffs, by 5,300,000; and for raw and half-manufactured goods, by 1,900,000 roubles; while the import of finished goods exceeded the export thereof by 200,000 roubles. The principal foodstuffs exported were: grain, 7,817,000 pouds; and lumber, to the value of 81,000 roubles; those imported: herrings and other fish, 47,000 pouds; vegetables and fruit, 10,000 pouds; wine, 9,000 pouds; and breadstuffs, 3,000 pouds.

Of the raw and half-manufactured goods the principal exports were: seed residues, 1,612,000 pouds; various seeds, 730,000 pouds; naphtha and its products, 390,000 pouds; flax and flax tow, 89,000 pouds; hemp and hemp tow, 48,000 pouds; the principal imports thereof were: drugs 161,000 pouds; cotton, 73,000 pouds; cast iron 33,000 pouds; raw hides, 4,000 pouds; and iron, 8,000 pouds. Of the finished goods the principal imports were: machinery and apparatus, 4,000 pouds; and steel and iron wares, 2,000 pouds.

Greece: The value of the import for 1886 to 1890 inclusive reached successively: 800,000; 800,000; 700,000; 1,200,000; 700,000 paper roubles, or an average of 800,000 paper roubles distributed as follows: foodstuffs, 42 per cent; raw and half-manufactured materials, 56 per cent; finished goods, 2 per cent.

The export value for the same period was successively as follows: 8,000,000; 9,800,000; 8,800,000; 6,800,000; 8,200,000 roubles, or on the average, 8,300,000 roubles; out of this number 88 per cent fell to foodstuffs; one per cent, to raw and half-manufactured goods; 9 per cent to animals; and 2 per cent, to finished wares.

The difference between the figures of the import and export, the latter exceeding the former on the average by 7,500,000 roubles, according to the various class of wares ran, as follows: the export exceeded the imports for foodstuffs, by 7,000,000; for animals, by 700,000; and for finished goods, by 100,000 roubles; while the import of raw and half-manufactured materials exceeded the export thereof by 400,000 roubles. Of the foodstuffs the principal exports were: grain, 7,794,000 pouds; all kinds of caviar, 31,000 pouds; and the principal imports: fruit, 101,000 pouds; and wine, 52,000 pouds. Of the raw and half-manufactured goods, lumber to the va-

lue of 54,000 roubles, was the principal export; the principal imports being: olive oil, 66,000 pouds, and wood bark, 40,000 pouds. The principal animals exported were; rams and sheep, 32,000 head; and oxen and cows, 7,000 head.

Norway: The value of the import for 1886 to 1890 inclusive, was successively as follows: 3,300,000; 4,300,000; 2,300,000; 3,400,000; 2,600,000 roubles; out of which number 96 per cent fell to foodstuffs; to raw and half-manufactured goods, and finished wares, 2 per cent each.

The export value for the same period was successively as follows: 4,800,000; 4,600,000; 5,600,000; 4,000,000; 2,300,000 roubles, or on the average 4,300,000 roubles paper, distributed as follows: foodstuffs, 89 per cent; raw and half-manufactured goods, 11 per cent.

The total export exceeded the import on the average by 1,100,000 roubles, the difference in the figures according to the class of wares being: the export exceeded the import on the average by 800,000 roubles, for foodstuffs; by 400,000 paper roubles, for raw and half-manufactured materials; on the contrary, for finished goods the import exceeded the export by 40,000 roubles. Of the foodstuffs the principal exports were: grain, 5,458,000 pouds; meat, 5,000 pouds; the principal imports: herrings and other fish, 2,643,000 pouds.

Of the raw and half-wrought goods the principal exports were: lumber to the value of 48,000 roubles; naphtha products, 84,000 pouds; various seeds, 55,000 pouds; hemp, 50,000 pouds; seed residues, 17,000 pouds; and the principal imports: spermaceti and train oil, 8,000 pouds, and dye clays, 3,000 pouds. The principally imported finished goods were carpenter and cooper wares, 3,000 pouds.

EXTERNAL TRADE OF ASIATIC RUSSIA.

The Caucasian coast of the Black Sea: The value of the goods imported across the Black Sea frontier to the Caucasus amounted for 1886 to 1890 successively to: 4,100,000; 5,300,000; 7,400,000; 7,700,000; and 9,500,000 roubles, or on the average to 6,800,000 roubles; out of which number 5 per cent fell to foodstuffs; 72 per cent to materials; and 23 per cent to finished goods.

The growth of the import relates mainly to raw and half-manufactured materials, tin being first among them, as it is greatly needed in the manufacture of tin cases for the export of kerosene. No import duty is levied upon tin if it is to be returned abroad. The value of tin exported in the shape of cases, for 1886 to 1890 inclusively, amounted successively to: 500,000; 1,100,000; 2,400,000; 3,000,000; 4,100,000 roubles, or on the average to 2,200,000 roubles paper. If these data be excluded from the former, an average of 4,600,000 roubles will show the net value of the import during this period.

The value of the export across the same frontier for 1886 to 1890 inclusive may be fixed successively at: 22,600,000; 23,600,000; 31,200,000; 47,400,000; and 59,900,000 roubles, or at an average of 36,900,000 roubles, distributed as follows: foodstuffs, 36 per cent; materials, 61 per cent; finished goods, 3 per cent. Both the import and export of animals were inconsiderable. In 1891 the import value was

9,600,000, and the export reached 56,800,000 paper roubles, thus differing but little from the figures of 1890.

Excluding tin, which was returned abroad, the export exceeded the import on the average by 32,300,000 roubles, this sum being distributed as follows: the export of foodstuffs, by 12,800,000; of raw and half-manufactured goods, by 20,000,000 roubles; the import of finished goods, on the contrary, exceeded the export thereof by 500,000 roubles. The same is true with regard to the data of 1891. The principal articles of the import, tin excluded, were: of the foodstuffs, vegetables and fruit in an average quantity of 43,000 pouds; and colonial wares, 6,000 pouds; during the same period 16,400,000 pouds of grain were exported, on the average.

Of the raw and half-manufactured materials the principal imports were: lumber, to the value of 285,000 roubles; cast-iron, 25,000 pouds; iron, 213,000 pouds; steel, 25,000 pouds; tin, 17,000 pouds; lead, 30,000 pouds; drugs, 395,000 pouds; coal and coke, 280,000 pouds; the principal exports were: naphtha and its products, 26,300,000 pouds; manganese ore, 4,300,000 pouds; linseed, 1,500,000 pouds; raw silk, 21,000 pouds; and wool unspun, 194,000 pouds. Liquorice was exported as follows; in 1889, 191,000 pouds; in 1890, 345,000 pouds; and in 1891, 838,000 pouds. Out of the total amount of the turnover of the Caucasian-Black Sea coast during 1886 to 1890, namely of 43,700,000 roubles, 64 per cent fell to the trade carried on in Batoum; 21 per cent to that of Novorossisk; and not over 15 per cent to the other points of the seacoast.

For *Batoum* the value of the import for 1886 to 1890 inclusive amounted successively to: 4,000,000; 5,100,000; 7,100,000; 7,500,000; 9,400,000 roubles, or to an average of 6,600,000 roubles, out of which 5 per cent fell to foodstuffs; 73 per cent to raw and half-wrought materials; and 22 per cent to finished goods. The export value reached for the same period successively: 14,400,000; 15,800,000; 23,300,000; 25,300,000; 27,300,000 roubles, or an average of 21,200,000 roubles distributed as follows: foodstuffs 8 per cent; materials, 87 per cent; finished goods, 5 per cent.

The average export exceeded the import by 14,600,000 roubles; the export of foodstuffs exceeding the import thereof by 1,300,000 roubles paper; that of materials, by 13,600,000 roubles; while the import of finished goods exceeds the export by 300,000 roubles. In 1891 the export value exceeded the import by 20,500,000 roubles.

The total weight of the exported goods for the given period reached successively: 14,600,000; 17,800,000; 30,300,000; 39,600,000; and 44,500,000, or on the average 29,400,000 pouds. The total weight of the imported goods was successively as follows: 1,300,000; 2,100,000; 3,500,000; 4,100,000; 4,900,000, or on the average 3,200,000 pouds. In this number the following successive import of tin is included: 100,000; 400,000; 900,000; 1,100,000; 1,500,000 pouds. In 1891 the total weight of the exported goods reached 50,000,000 pouds; and that of the imports 6,200,000 pouds.

During the period of 1886 to 1890 the principal exported foodstuffs were: grain, 1,360,000 pouds; and kitchen salt, 206,000 pouds; the principal imports thereof were: vegetables and fruit, 38,000 pouds; herring and other fish, 2,000 pouds; colonial goods, 6,000 pouds; grape wine, 2,000 pouds; and mineral waters, 1,000 pouds.

Of the raw and half-manufactured materials the principal exports were: lumber, to the value of 47,000 paper roubles; nut and palm wood, 153,000 pouds; various seeds, 29,000 pouds; flax and combed flax, 6,000 pouds; skins, 8,000 pouds; hides, 15,000 pouds; wool unspun, 194,000 pouds; naphtha and its products, 26,146,000 pouds; liquorice 107,000 pouds; and manganese ore, 722,000 pouds; from 1886 to 1892 the export of mineral lighting oil was successively as follows: 6,900,000; 9,000,000; 21,100,000; 29,400,000; 36,200,000; 41,100,000; 44,100,000. In 1891, 3,100,000 pouds of lumber were brought from abroad, chiefly for the making of tanks for kerosene, without reckoning 1,900,000 of Russian lumber obtained by the coasting trade.

Of the finished wares the principal imports were: faïence and porcelain, 1,000 pouds; glass, 3,000 pouds; wrought cast-iron, 35,000 pouds; iron and steel wares, 86,000 pouds; machines and apparatus, 35,000 pouds; paper wares, 3,000 pouds; flax and hemp goods, 6,000 pouds. A considerable part of the goods imported through Batoum, about 22 per cent, if tin be not reckoned, are brought to the customhouse of Tiflis, whence they are distributed for the interior consumption.

The land frontier of the Caucasus and the Caspian Sea: The returns of the foreign trade across the Russo-Turkish frontier are inconsiderable, and do not exceed yearly the sum of 300,000 roubles for the import, and an equal amount for the export; the principal article of import is grain, 146,000 pouds in 1891; and of the export, rams and sheep, in 1891, 4,000 head.

The trade with Persia is carried on: 1. through the customhouses of the Russo-Persian frontier; 2. through those of the ports of the Caspian Sea; 3. by land, from the eastern coasts of this sea, by means of the Transcaspian Railway from Ousoun-Ada to Askhabad, and then farther to Meshed. Unfortunately there are but few data relating to the turnover of the latter trade. During the period from 1886 to 1890 across the Russo-Persian land frontier goods were imported to an average value of 4,000,000 roubles paper, and in 1891, to 3,300,000 roubles; the export for the same period averaged 1,000,000 and 1,400,000 roubles paper.

The import by sea from Persia reached in 1891, 7,600,000 roubles, including the wares brought to the Ousoun-Ada customhouse by land, on which a 5 per cent duty had been levied, as the full duty installed for the Persian wares is placed on such goods as go to the other ports of the Caspian Sea. The export by sea amounted to 8,500,000 roubles. According to the customhouse data, the total import of goods from Persia for 1891 may be estimated at 10,900,000 roubles, and the export thereto at 9,900,000 paper roubles; thus the import exceeds the export by one million paper roubles.

The returns of separate Caspian customhouses reached in 1891 the following amounts: Baku, import 3,500,000; export, 8,900,000; Astrakhan import 3,200,000; export 1,500,000*; Ousoun-Ada import of wares on which a 5 per cent duty had been levied, 900,000; export by sea, 30,000 paper roubles. As to the export trade of Astara it has no importance, for in the traffic with Persia all the cargoes are carried by land to Ardebil, and to the Astara port they are brought as articles of the coasting trade, belonging therefore to the interior trade.

* These figures refer only to the trade with Persia, as the traffic with the khanates of central Asia will be treated separately.

The Central Asiatic frontier: Goods manufactured in Central Asia are imported through Astrakhan free of duty; in 1891 their value reached 1,900,000 roubles paper. On all the wares brought to the Transcaspian province, and not carried by sea to Astrakhan or Baku, a *pach* is raised; among such wares, besides those of the Central Asiatic production, are some of the Persian, English colonial (East Indian) and other wares. The *pach* is not returned if the wares are further exported from the Transcaspian province, and even if they are carried to the Russian Turkestan. In 1891 the *pach* was raised on wares to the value of 3,200,000 paper roubles.

Across the Central Asiatic frontier to Russian Turkestan taxed goods were imported to the value of 1,600,000 and untaxed to that of 2,300,000 roubles paper. Wares to the value of 4,200,000 roubles were carried across the same frontier to the khanates of Central Asia. On considering, moreover, that in 1890 goods were imported from Russia and Bokhara to Afghanistan for the sum of 3,900,000 roubles; and into Russia and Bokhara from East India, Kaboul, and Afghanistan to the value of 4,000,000 roubles, it will be plainly seen that the traffic on the area between the eastern coast of the Caspian Sea and the western frontier of Russian Turkestan has now reached such dimensions, as were unthought of a few years ago. The figures showing the absolute turnover are, however, of less importance than the general results obtained in so short a period, owing to the pacifying of the country by the Russians, and especially less than the numerous beneficial results gained by the building of the Transcaspian Railway.

A regular trade traffic exists and has long existed through Orenburg; by this way a quantity of cotton is carried to European Russia from Central Asia, but since the establishment of steamboat communication along the river Amu-Darya, which renders it possible to bring the cargoes to the station Chardjouy of the Transcaspian Railway, this quantity has considerably diminished.

The ceaseless riots in the neighbouring Afghanistan hindering the traffic between East India and Bokhara, together with the convenience and cheapness of the carriage by the Transcaspian Railway, induced the tradesmen to bring the East Indian tea and English cotton tissues through Bender-Boushir and Meshed to Doushak and Askhabad, from whence they reach Bokhara and farther by the railway.

If the goods carried through Khiva and Bokhara as transit wares be not counted the principal articles of the trade between European Russia and Russian Turkestan in this region were the following. Through Astrakhan and Baku there were exported in 1891, excluding the sugar sent to Persia, 266,000 pouds of raw and 181,000 pouds refined sugar; on the whole 447,000 pouds, out of which 130,000 pouds were carried to Russian Turkestan; the other 317,000 pouds show the consumption of the Transcaspian province and of the adjoining countries. In the mean time 1,340,000 pouds of raw cotton were imported into Russia and the Caucasus from Central Asia, not counting the 1,433,000 pouds exported from Russian Turkestan. Tea was imported into the Transcaspian province in a quantity of 70,000 pouds on which the *pach* was raised; across the Central Asiatic frontier 37,000 pouds were brought to Turkestan. The above-mentioned wares have a great importance to Russia with regard to the fisc, and the direction of their traffic is already quite definite. Relatively to the other wares, and especially to all sorts of finished goods, it is impossible to state from the data given, the details and

dimensions of the trade traffic. The former ways have now been left off; the Transcaspian Railway has gained great importance and serves as the principal line for all Central Asia, but the dimensions of the normal returns of its trade with Russia are as yet not finally determined, as the contest for the markets of Central Asia is still prevailing.

The principal wares on which in 1891 the *pach* was raised, besides tea and raw cotton were: raw wool, 98,000 pouds; grain, 186,000 pouds; flour, 177,000 pouds; dried fruit, 70,000 pouds; animals, to the value of 144,000 roubles paper. The total value of the goods on which the *pach* was raised amounted to 3,200,000 paper roubles, out of this sum 48 per cent fell to foodstuffs, 30 per cent to raw and half-manufactured goods, 5 per cent to animals, and 17 per cent to finished wares. Besides tea, the principal wares imported to Russian Turkestan were: grain, 177,000 pouds; fresh fruit, 34,000 pouds; almonds, 17,000 pouds; undressed hides, 11,000 pouds; animals, to the value of 66,000 roubles paper; all kinds of tissues, estimated at 485,000 roubles, et cetera.

Of the wares exported from Russian Turkestan to the neighbouring khanates the principal were: grain, 1,800,000 pouds; dried fruit, 38,000 pouds; grape wine, 8,000 pouds; various seeds, 53,000 pouds; animals, to the value of 370,000 roubles; cotton fabrics, 9,000 pouds. As to the wares imported from European Russia and the Caucasus to Ouzoun-Ada, it is impossible to separate those intended for the Transcaspian interior trade; however, from the return of the Transcaspian Railway it may be seen that in 1890 from Ouzoun-Ada the following cargoes were sent by that railway: manufactured goods, 541,000 pouds; kerosene, 135,000 pouds; groceries 19,000 pouds; porcelain plates, 22,000 pouds; cotton yarn, 60,000 pouds; brandy and liquors, 26,000 pouds.

The general value of the wares brought to Bokhara may be fixed at 17,000,000 roubles, and that of those exported, at 15,000,000 roubles paper. The principal products in which Bokhara abounds are: cotton, wool, sheepskins (*karakouli*), raw silk, dried fruit, carpets, tissues, et cetera. The distribution of the export and import of these goods to different countries will now follow the laws of demand and offer general to all the Russian parts of Central Asia.

Russian-Chinese frontier: In 1891 there were brought wares from China, through the customhouses of the Turkestan district, to the value of 1,200,000 roubles, and through the customhouses of the Semipalatinsk customs districts, to that of 800,000 roubles, or on the whole, to the value of 2,000,000 roubles paper. In the same year the export through both of these points of the frontier reached 3,200,000 roubles. In these figures the value of the Chinese cotton tissue, called *daby* brought from Kashgaria to Kouldzha transit through Issyk, Koulsk district, is included.

Besides cotton tissues the chief imports through the above-mentioned customhouses were: woollen goods, 23,000 pouds; wool, 56,000 pouds; undressed hides, 21,000 pouds; pelts, 15,000 pouds, all these being mainly products of cattle breeding. Conformably to this, the chief exports from Russia were: sugar, 9,000 pouds; grain, 42,000 pouds; vegetables, 12,000 pouds; candles, 2,000 pouds; mats, 7,000 pouds; dyes, 4,000 pouds; unwrought metals, mainly iron, 43,000 pouds; metallic wares, 14,000 pouds; horses, 7,000; rams and ewes, 30,000. Thus, in the export foodstuffs and products of the mining industry prevail over other articles.

The small dimensions of the turnover are to some extent explained by the fact mentioned in the customs return for 1891, namely the stoppage of the exportation of tea from China across the western frontier, as after the measures taken by the Russian Government it cannot be done free of duty; under these measures the recent establishment of a regular supervision of the whole Russo-Chinese frontier from Afghanistan to the Sououksk summit must be understood. Another reason retarding the trade in the district is the fact, that Western China does not produce any other export except *daby*, the import of the Russian wares thereto depending therefore greatly on the receiving of the *yamb* silver from Interior China, for support of the army and administration. This silver is used in payment for the Russian wares; the Russian traders send these *yambs* to Kiakhta in exchange for tea. Besides, it should be mentioned that the export of cattle, which in 1891 amounted only to 234,000 roubles, as compared to that of 1884 reaching 533,000 paper roubles, was abnormally small, thus explaining the insignificant excess of the export value over the import in that year.

At the frontier of the Ussinsk district of the Yeniseisk government a trade by barter is carried on with the Uriankhaisi, whose villages are situated along the upper part of the river Ussa. The value of the wares obtained in this way in 1891 may be fixed at 100,000 roubles. Russia receives principally pelts, 33,000 pouds; and exports, besides cotton fabrics (191,000 arshines), an inconsiderable quantity of tobacco, leather, horn, and iron wares. In 1890 a lot of tea was brought for trial through the town of Minussinsk, floating down the river Yenisei; the cost of the transport by this way appeared to be less than by sending it through Kiakhta.

The principal customhouse for the Russo-Chinese trade by land is the Irkoutsk, situated about 600 versts from the frontier. Before the giving of the permission to bring tea to European Russia straight by sea, all the teas imported to the Empire passed through Irkoutsk. Owing to the rising consumption of tea in Russia, the traffic in Kiakhta teas has not decreased even until now, notwithstanding the considerable dimensions the import thereof by sea had reached.

Besides tea there are yearly brought to the Irkoutsk customhouse some thousands of pouds of Chinese silken tissues, some other Chinese wares, and European goods sent by post. The total value of the wares imported through the Irkoutsk customhouse averaged, from 1886 to 1890, 22,000,000 roubles paper, and in 1891, 13,000,000 roubles. Tea for interior consumption was sent out as follows: Bohea tea in 1889, 416,000; in 1890, 302,000; in 1891, 302,000; in 1892, 379,000 pouds; brick tea, in 1889, 763,000; in 1890, 668,000; in 1891, 775,000; in 1892, 806,000 pouds; cake tea, *plitochny*, in 1889, 10,000; in 1890, 32,000; in 1891, 33,000; in 1892, 32,000 pouds.

The fluctuations in the figures referring to Bohea tea depend to a certain degree on the demands of the markets of European Russia. The increase in the import of brick tea is explained by a large consumption thereof in Siberia, as well as by the fact that its use begins to spread in the eastern governments of European Russia. The cake tea, *plitochny*, serves as a surrogate to the cheaper sorts of the Bohea tea; the consumption thereof does not decrease, although in 1891 the duties thereon were raised from 6 roubles to 10 roubles in gold per poud. The wares are brought to the Irkoutsk customhouse for the greater part through Kiakhta, the

remainder of them by the river Amour, but the transport by this last way increases yearly.

Not all the Chinese wares brought through Kiakhta are carried to Irkoutsk, some of them are sent to Verkhneoudinsk and other localities of the Transbaikalia, and further to Chita and Blagoveschensk on the Amour. The trade returns furnished by the older Kiakhta merchants can serve as materials to judge of the export trade of the Irkoutsk region. From 1886 to 1890 the value of the Russian goods exported to China through Kiakhta was on the average 1,800,000 paper roubles, and in 1891, 1,500,000 paper roubles. The principal exports were: cloth, 150,000 arshines; cotton fabrics, from 800,000 to 900,000 arshines; horns of the saiga and the roedeer, to the value of 140,000 roubles; leather, to the value of 275,000 roubles; and furs, for 300,000 roubles.

Besides this, foreign furs were exported, in 1892, to the value of 76,000 roubles; and Chinese wares, such as tea, sugar, and sugar candy, were in an inconsiderable quantity imported from China.

Littoral region: According to the data given by the local Governor-General, in 1885 wares, with the exclusion of tea, were imported to the Amour region for the sum of 8,300,000, and in 1889, to 10,000,000, paper roubles. The import to the ports of Eastern Siberia was as follows: from Hamburg in 1890, to the value of 2,200,000, and in 1891, to that of 2,400,000 German marks; from the United States of America in 1890 to 1891, to the value of 200,000, and in 1891 to 1892, to that of 100,000 dollars; from China, mostly tea, in 1890 for the sum of 600,000, and in 1891 for that of 900,000 taels; from European Russia in 1890, to the value of 11,700,000, in 1891, to that of 14,200,000, and in 1892, to 13,200,000 roubles paper. Of the wares subjected to customs duties in 1891 were imported: 5,000 pouds of spirits, and 2,000 pouds of matches. In general, all kinds of finished wares and foodstuffs constitute the import.

The export trade of the Littoral region may be seen from the following figures. The principal goods exported to the United States of America are furs; in 1890 to 1891 their export value reached 100,000, and in 1891 to 1892, 300,000 dollars. The principal exports to China are sea cabbage, gentian, and fish, reaching in 1890, as well as in 1891, to the value of 200,000 taels. The Russian Sealskin Co. reports that in 1891 the export of sealskins from the Commander Islands reached 319,000 roubles gold, and 1892, 365,000 roubles in gold.

From the above given data it may be seen that in the export trade of the Littoral region, European Russia tends of late to outrival other countries. The further development of the marine trade of Eastern Siberia depends on local conditions, as much as on the course the activity of the Russian Free Fleet will take.

TRADE WITH FINLAND.

The value of the import from 1886 to 1890 inclusive was successively as follows: 9,900,000; 10,800,000; 11,400,000; 13,300,000; 13,400,000, or on the average, 11,700,000 paper roubles; out of this, 22 per cent fell to foodstuffs; 37 per cent, to raw and half-manufactured goods; 4 per cent, to animals; and 37 per cent, to finished wares.

The export value for the same period was successively as follows: 16,600,000; 17,000,000; 19,300,000; 17,600,000; 16,700,000; or on the average 17,400,000 paper roubles, distributed among the kinds of wares in the following way: foodstuffs, 53 per cent; raw and half-wrought materials, 17 per cent; finished wares, 30 per cent. The total export exceeded the total import on the average by 5,700,000 paper roubles; namely, the export exceeded the import of foodstuffs by 6,700,000 paper roubles; of finished goods, by 900,000 paper roubles; on the contrary, raw and half-manufactured goods were imported to a value exceeding the export value thereof by 1,400,000 roubles; the import of animals also exceeded the export by 500,000 paper roubles. Of the foodstuffs the principal exports were: grain, 5,554,000 pouds; meat, 35,000 pouds; cow butter, 34,000 pouds; eggs, 3,500,000 pieces; confectionery and jam, 17,000 pouds; gingerbread and all kinds of pastry, 10,000 pouds; sugar, 44,000 pouds; tobacco, 146,000 pouds; and the principal imports: cow butter, 130,000 pouds; herrings and other fish, 111,000 pouds.

Of raw and half-manufactured goods the chief exports were: raw and combed flax, 46,000 pouds; hemp and tow, 36,000 pouds; bones, 127,000 pouds; rags, 69,000 pouds; hides, 20,000 pouds; wool unspun, 5,000 pouds; naphtha products, 476,000 pouds; apothecary wares, 14,000 pouds; vegetable oils, 53,000 pouds; and the imports: lumber, to the value of 911,000 paper roubles; dressed hides, 31,000 pouds; flax and hemp yarn, 18,000 pouds; wood-paper mass, 518,000 pouds; unwrought cast-iron, 335,000 pouds; iron, 467,000 pouds; brass, 18,000 pouds; tannin, 215,000 pouds.

Of the finished wares the principal articles of export were: metallic wares, to the value of 410,000 paper roubles; flax and hemp wares, 52,000 pouds; woollen, 6,000 pouds; cotton tissues, 52,000 pouds; wood wares, 87,000 pouds; guttapercha and India rubber wares, 15,000 pouds; perfumed and ordinary soap, 23,000 pouds; candles, 31,000 pouds; those of the import: faïence wares, 10,000 pouds; glass wares, 154,000 pouds; wrought cast-iron, 26,000 pouds; iron and steel wares, 26,000 pouds; machines and apparatus, 7,000 pouds; paper wares, 740,000 pouds; flax and hemp goods, 13,000 pouds.

In 1891 there were imported to Russia from Finland duty free: 400,000 pouds of unwrought cast-iron; 385,000 pouds of all sorts of iron; 18,000 pouds of machines and apparatus; 47,000 pouds of cotton fabrics; 7,000 pouds of faïence wares; 28,000 pouds of brass; 7,000 fox pelts; and some other wares in inconsiderable quantities.

The import across the land frontier, the cargoes brought by rail included, during the period of 1886 to 1890 constituted on the average 67 per cent of the total import value; 28 per cent fell to the import by sea, and 5 per cent to that by Lake Ladoga through Schlüsselburg. In the export, 55 per cent of the value fell to the land frontier; 43 per cent, to the export by sea; and not more than 2 per cent to that by Lake Ladoga. The Finnish goods are mainly carried to St. Petersburg; the wares exported to Finland are alwast exclusively freighted in St. Petersburg. Namely, the import to St. Petersburg by rail amounts to 7 million roubles; by sea, to 2 million roubles; and by the Neva, to 500,000 roubles; or on the whole, to nine and a half million roubles, forming over 80 per cent of the total import from Finland. The export from St. Petersburg by different tracts equals 16 and a half million roubles, or over 95 per cent of the total Russian export to Finland.

The Finnish wares are carried also in considerable quantities to Reval (fish), and to Riga (iron and bottles.)

TRADE AT THE MOUTHS OF THE PECHORA, OBI, AND YENISEI RIVERS, AND ON THE MOURMAN COAST.

The coasts of the Arctic Ocean were known to the Russian traders already in the sixteenth century, where an exchange trade was going on; namely, fish and furs were exchanged for very ordinary iron wares, grain, clothes and crockery, such a trade proving very advantageous. At present the extreme north is again attracting general attention; measures are sought to enhance the economical welfare of the inhabitants of the coast, and the establishment of regular mercantile relations between the extreme northern region and the larger trade centres is greatly increased. As no permanent customs institutions exist in the above-mentioned places, it is impossible to have current notes of the turnover of the trade carried on along the coasts of the Arctic Ocean. Only fragmentary data upon the subject are to be found, which, however, give reason to suppose that even this remote outskirts may under certain conditions be of some importance to the Empire.

The mouth of the river Pechora has long ago served as an outlet to the sea for the products of an immense region comprising even a part of Siberia. The principal exports from here are deer skins, hides, and tallow; hence are also brought all kinds of pelts and Karsk fish from the Yugorsk Round to be sent abroad. The articles of import were: salt, oliveoil, kerosene, tobacco, rice, and ground colours.

In the first half of the present century a conviction was formed that the Kara Sea was not navigable. This opinion was refuted, thanks to the exclusive endeavours of one of the eminent Russian promoters, Sidorov, and in the seventies a series of attempts, more or less successful, were made to establish direct mercantile relations with the interior of Siberia, with the view of carrying the wares by sea and up the rivers Obi and Yenisei. The most successful voyages were those of Captain Dale on the ship «Louisa», which went up the rivers Obi and Irtysh to Tobolsk; and of the celebrated traveller Nordensjöld on the yacht «Vega», entering the Yenisei. In 1888 the steamer «Neptune» came from Hamburg to the Obi Bay; and Baron Knoop brought a cargo from the coasts of the Yenisei to Bremen on the «Moscow». During the same year an English steamer «Phoenix» under the command of Wiggins, which tried already in 1874 to reach Siberia by sea, came as far as Yeniseisk. Finally in 1890 three English steamers «Biscay», «Touley» and «Bard» reached successfully the borders of the Yenisei, bringing wares to the value of 300,000 roubles, among which there were: 31,000 pouds of different metals; 13,000 pouds of metallic wares; 5,500 pouds of kerosene; further, salt, cables, olive oil, cement, et cetera. These wares were sold in Krasnoyarsk, Tomsk, and Irkutsk. The steamers went back with cargoes of grain and meat.

In order to further the marine trade with the north of Siberia, different persons were allowed to carry wares to the mouths of the rivers Obi, Yenisei, and Lena free of duty. In the present year an order was issued by the Emperor to organize a special expedition for a new investigation of the Yenisei Bay and river. The fishermen, mostly peasants of the Onega and Kemsk districts, have disposed their

settlements, *stanovischi*, along the Mourman coast. The fish is partly sent to Archangel, partly goes by sea to the Baltic ports. The salt needed by the fish traders is brought from abroad with no duty levied thereon; but since 1886 the import of foreign spirits to the Mourman coast is prohibited.

IMPORT AND EXPORT OF UNWROUGHT GOLD AND SILVER.

In general, Russia exports gold and receives silver from abroad, as the home production thereof does not answer the demands of the Russian industry and trade. The total import of gold for the period of 1887 to 1892 was successively as follows: across the European frontier: 104; 1,268; 125; 1,028; 5,046; 7,388 pouds; and across the Asiatic frontier: 35; 62; 66; 97; 104; 43 pouds. The total export was, across the European frontier: 1,179; 2,188; 1,233; 1,131; 13; 11 pouds; and across the Asiatic frontier: 17; 37; 9; 73; 31; 5 pouds. For the same years silver was imported successively as follows: across the European frontier: 3,525; 11,106; 10,811; 8,939; 9,447; 9,640 pouds; and across the Asiatic frontier: 845; 1,271; 1,263; 1,570; 5,587; 3,441 pouds. The export was, across the European frontier: 74; 34; 130; 2,764; 25; 32 pouds; and across the Asiatic frontier: 3,213; 4,565; 4,177; 2,957; 7,600; 6,038 pouds.

Thus, from 1887 to 1890, the export of gold exceeded the import thereof successively by: 1,057; 895; 1,051; and 79 pouds; while in 1891 and 1892 the import exceeded the export by 5,106 and 7,415 pouds; meanwhile during all the period there was an excess in the import of silver, namely by: 1,083; 7,778; 7,767; 4,788; 7,409; and 7,011 pouds. The foreign trade in gold is principally carried on across the European frontier, and only across this frontier the import and export of gold in ingots is noticed; as for silver, it is almost exclusively brought in ingots across the European frontier; a certain quantity of silver in ingots is exported across the Asiatic frontier, and a still smaller part is exported in the shape of Persian coin.

It should be mentioned, however, that the above given figures do not show the total quantity of precious metals carried across the frontier of the Empire. The amounts of gold and silver carried by travellers, and those transported as baggage, are not signified to the customhouses and therefore not included in the above figures.

The movements of gold for the latter years are chiefly explained by the operations of the State Bank tending to concentrate a great quantity of gold in St. Petersburg; thus, according to official data, there were in St. Petersburg in December 16 (28), 1891, 404,700,000 roubles in gold, and in December 16 (28), 1892, 528,000,000 roubles in gold, not reckoning the gold the Government had abroad (106,800,000 and 76,400,000 roubles in gold). In the figures of the import and export of silver, across the Asiatic frontier, the Chinese yambs are included which, are chiefly imported to Western Siberia and exported through the Irkutsk customhouse.

CUSTOMS DUTIES.

Customs tariffs: The foreign wares imported across the European frontier are subjected to customs duties according to the general tariff confirmed in 1891, with

the exclusion of the ports of Finland, where the duties are levied according to the special tariff of Finland.

For the wares imported through the customhouses in the Caucasus the duties are as follows: *a.* at the Black Sea coast, according to the tariff for the import across the European frontier; *b.* at the land frontier with Turkey and Persia, for Asiatic wares, 5 per cent of the value in gold; for European wares and Persian tobacco grown from American seed, according to the tariff of the European frontier; *c.* at the Caspian ports of the Caucasus and at the customhouse of Astrakhan, for the wares of European origin, according to the tariff of the European frontier; for the wares of Persian origin, 5 per cent of the value in gold, except fish cured with Russian salt, the duty thereon being diminished by 4.5 kopecks per poud; wares of Central Asia are allowed to be imported free of duty.

In the bounds of the Transcaspian region the duties levied on foreign goods amounted to 2.5 per cent of their value in paper roubles. If the wares be brought from Ousoun-Ada to Astrakhan or the Caucasian ports, an additional duty to the full amount is levied; namely to 5 per cent of the value on Persian goods, and on the European wares according to the tariff table established for wares brought across the European frontier.

On the wares imported through the customhouses of the Turkestan customs region, that is, of the Turkestan Governor-Generalship and of a part of the Semirechinsk district, duties are levied according to a mixed tariff, namely: on some of the Anglo-Indian wares in dimensions specially established for that region, such as 14.40 paper roubles per poud on green tea; 6 paper roubles per poud on indigo; and 1 paper rouble per pound on muslin; on the other wares duties are levied according to the tariff in force for the goods imported across the European frontier, but in paper values instead of gold, conformably to the exchange accepted by the Government revenue roll. On brick tea a duty of 4 paper roubles per poud is levied, and on Bohea tea, 21 roubles are levied per poud.

Furthermore, on the Chinese frontier within the boundary of the Semipalatinsk customs region, and at the Irkutsk customhouse, duties are levied only on tea, namely: on Bohea tea, 13 roubles in gold per poud; on cake tea (*plitochni*) bearing the mark of Russian factories, 10 roubles in gold per poud; and on brick tea, 2.50 roubles in gold per poud. Other wares of Chinese origin are imported duty free; the European wares brought through the Irkutsk customhouse and those of the Semipalatinsk district are subjected to duties of the general tariff. The exchange trade carried on with the Ouriankhaitsi is practically free. Of the goods brought through Vladivostok and Nikolaevsk on the Amour, duties are levied according to the general tariff on spirits, naphtha, sugar, matches and spirit varnishes; in general, on excised articles, other wares being allowed to be imported free.

Export duties are levied only on rags, crude bone, unground phosphorites, calamine, brass and lead ores, palm wood and nut wood spunk, and only in the case when they are exported across the European frontier and across the Black Sea coast of the Caucasus. There are no transit duties in Russia.

Wares brought from Finland, being of local make, are not subject to duty; regulating taxes are only placed on some of the goods, as has already been mentioned, namely: on wood paper mass, paper, wall paper, and the like; on unwrought

cast-iron and iron; on iron wares and the like; on cotton yarn, hides, faïence, and glass wares; moreover, with regard to some of these articles, duties are only levied on quantities exceeding the definite standard. The dimensions of the duties on Finnish goods are on the average considerably lower than the general customs dues. No export duties are levied on goods sent to Finland. In Finland duties are levied on the following Russian wares: on liquors, sugar, sirup, tobacco, and salt; the import of brandy is totally prohibited. Export duties are levied on bone, and unsawn timber sent to Russia.

The returns of the customs duties on imported goods: The general amount of the customs duties levied on imported goods was as follows: in 1869, 39,600,000 paper roubles; in 1879, 63,200,000 roubles in gold; in 1889, 81,300,000 roubles; in 1890, 83,500,000 roubles; and in 1891, 80,300,000 roubles in gold.

The rapid growth of these revenues is explained by the gradual increase in the dimensions of the customs dues; by the placing of duties upon such wares as were formerly (by the tariff of 1869) allowed to be imported free; by the establishment of customhouses at such points of the Asiatic frontier as were formerly unprotected; and by the general development of the trade returns in Russia. During the above mentioned years, according to the data of the State Control, the amount of the duties levied on goods imported across the European frontier, the trade with Finland included, was: in 1869, 38,200,000 paper roubles; in 1879, 60,600,000 roubles in gold; in 1889, 71,200,000 roubles in gold; in 1890, 75,300,000 roubles in gold; and in 1891, 72,200,000 roubles in gold. It may be seen that the amount of the duties levied at the European frontier forms over 90 per cent of the total return. Out of the sums received at the Asiatic frontier over 75 per cent fall to the Irkoutsk customhouse.

The total amount of the duties levied at the European frontier on imported goods is distributed as follows, with regard to the class of wares: the duties levied on foodstuffs formed in 1892, 39 per cent of the total sum, while in the period from 1869 to 1873 they formed 51 per cent; the duties on raw and half-manufactured goods formed 44 per cent in 1892, and 20 per cent for the period of 1869 to 1873; those on finished wares equalled 17 per cent in 1892, and 29 per cent in 1869 to 1873. Thus the amount of the duties on raw and half-wrought materials has increased the most in all this time.

The largest revenue was given in 1892, on the whole, by tea, namely, 24,500,000 roubles in gold. The principal revenues gathered by the customhouses of the European frontier relate to: raw cotton, 11,400,000 roubles in gold; grape wine, 2,500,000 roubles; herrings, 1,800,000; machinery and apparatus, 3,700,000; chemical products, 2,500,000; woollen wares, 1,100,000; woollen yarn, 1,500,000; cast-iron, 1,500,000; iron, 1,800,000; coal and coke, 1,400,000 roubles in gold.

The ratio of the customs duties to the value of the goods equalled on the average, for all those brought across the European frontier, as follows: in 1869, 12 per cent; in 1879, 17 per cent; in 1889, 28 per cent; during the first eight months of 1890, 28 per cent, in the four last months, 30 per cent; in the first half of 1891, 29 per cent, in the second, 37 per cent, and in 1892, 34 per cent.

According to the classes of wares, the ratio between the customs dues and the value of the goods may be given for the same years, and parts of the years success-

ively, as follows: for foodstuffs: 31, 41, 71, 71, 69, 68, 82, and 79 per cent; for raw and half-wrought materials: 5, 10, 19, 17, 22, 19, 24, and 23 per cent; and for finished wares: 9, 15, 28, 27, 28, 32, 32, and 29 per cent.

The highest duties comparatively to the value are levied on foodstuffs, with view of increasing the fisc; furthermore, finished goods are comparatively taxed higher than raw and half-wrought materials.

The returns of the customs duties on exported goods: According to the data of the State Control the returns of the export customs duties were: in 1869, 296,000 paper roubles; in 1879, 122,000 roubles in gold; in 1889, 231,000 roubles in gold; and in 1891, 182,000 roubles in gold; the fluctuations in the figures of these revenues depend greatly on the dimensions of the export of rags across the European frontier, and of palm and nut wood across the Caucasian frontier.

When in 1891 the export duty on unground phosphorites was raised from 10 to 12 kopecks in gold per poud, its exportation ceased altogether, as it was found more advantageous to grind them before sending them abroad. It must be mentioned, however, that in 1892 the export of phosphorites exclusively in the ground state (466,000 pouds), exceeded the import of all kinds thereof in 1891 (417,000 pouds, out of which 100,000 pouds of ground phosphorites).

FOREIGN NAVIGATION.

In 1890, on the whole, 10,806 vessels, measuring 6,975,000 register tons, came to the ports of the external seas, the White Sea, the Baltic (Finnish ports excluded), the Black, and the Azov seas; and 10,640, measuring 6,941,000 register tons departed; of these came under the Russian flag 1,387, measuring 612,000 register tons, and 1,225 vessels, measuring 570,000 register tons, left the ports under the same flag, their number forming 12 per cent of the total, and 9 per cent with reference to measurement. The average tonnage of the vessels on which the Russian flag was hoisted is 468 register tons, being thus under that of the foreign vessels measuring on the average 676 register tons. Furthermore, 36 per cent of the total number fall to the vessels under the Union Jack, their measurement equalling 55 per cent; next come the German vessels, 16 per cent, and 11 per cent of the measurement; the Sweden-Norway, 14 per cent, and 8 per cent of the measurement; the Danish, 10, and 9 per cent; the Greek, 7.5, and 4.5 per cent; the Turkish, 7, and 1 per cent of measurement; those of the other countries forming a still smaller per cent. These figures show also that, with regard to measurement, the first place is held by the English vessels, and the last by the Turkish. In particular the number of vessels arrived was 7,711, measuring 3,176,000 register tons, and of those that left, 7,613, measuring 3,164,000 register tons, these figures forming 71 per cent of the total number and 91 per cent of the average measurement.

Of the vessels that arrived, those under the Russian flag were 654, measuring 243,000 register tons; and of those that left 559, measuring 226,000 register tons; thus, the Russian steamers formed 7 per cent of the total amount of the navigation with regard to the number, as well as to the measurement. The number of the arrivals with goods formed 44 per cent of the total number of vessels, 42 per cent of steamers, 76 per cent of the total number of Russian vessels, and 72 per cent of

Russian steamers; the ratio of the departing vessels was conformably to this as follows: 90, 91, 93, and 91 per cent.

If the average weight of the wares forming the import and export of the foreign trade be compared to the figures showing the total measuring of the vessels arrived and departed in foreign navigation, an idea can be formed as to the degree of the loading of the vessels arrived and departed at each of the seas separately.

For this purpose, only such totals must be taken into consideration, as cover cases of navigation between Russian ports of the same sea (quasi coasting), that is to say, that cases, where a vessel entered successively some of the ports of the same sea in order to unload foreign goods or take cargoes of Russian wares, were excluded; if this condition be kept, each vessel should be counted with reference to the number of voyages it made, and not to the number of ports it visited. The importance of such a correction may be seen from the fact that, in 1888 to 1890, there were on the average arrivals referring to quasi-coasting 229, to the Baltic Sea; 738, to the Black and Azov seas, the average yearly measurement of vessels being 138,000 register tons in the Baltic Sea, and 671,000 in the Black and Azov seas.

In order to fix for the above-mentioned purpose the total quantity of the wares of the foreign import and export it is necessary to add to the data, showing the amount of goods imported for consumption and that of the Russian goods sent abroad, the quantity of the wares brought in transit across the Empire, as well as of the wares which have been sent back to foreign countries or returned from there.

On obtaining the data necessary for the above mentioned comparison, it will be seen that in 1888 to 1890, the average measurement of the vessels departed from the White Sea was 183,000 register tons; from the Baltic Sea 2,879,000 register tons, and from the Black and Azov seas, 3,651,000 register tons. The total weight of the wares exported during the same years across the White Sea frontier equalled 14,800,000 pouds; across the Baltic frontier, 223,500,000 pouds; and across the Black and Azov frontier, 375,500,000 pouds.

Thus one register ton of measurement equalled approximately 81 pouds of the export from the ports of the White Sea, 77 pouds from the ports of the Baltic, and 103 pouds from the ports of the Black and Azov seas. These average numbers are considerably smaller when referring to the vessels arrived from abroad. The average total weight of the wares imported across the White Sea frontier was 1,500,000 pouds; across the Baltic, 124,000,000 pouds; and across the Black and Azov Sea frontier, 31,900,000 pouds.

Without mentioning the data referring to the total amount of measurement of the vessels arrived from abroad, as they are nearly equal to those of the vessels departed, it may, however, be seen that on the average one register ton of the vessels arrived at the ports of the White Sea equalled 8 pouds of wares; of those arrived at the Baltic ports, 43 pouds; and at the Black and Azov sea ports, 9 pouds. It may be seen from these data to what degree the goods brought from abroad act as ballast.

The total return of the navigation for 1891 is distributed with regard to the different seas as follows: to the White Sea 6 per cent of the number of vessels, and 3.3 per cent of the measurement; to the Baltic, 52 and 41.1 per cent; to the Black and Azov seas, 42 and 55.6 per cent. The navigation is more intense in the southern

seas. The average measurement of the vessels entering the White Sea ports is 356 register tons; the Baltic, 512 register tons; and the Black and Azov ports, 856 register tons. The largest vessels are seen in the southern ports. Thus, of the vessels going abroad and drawing more than 20 feet of water, 444 left the port of Odessa; 172, Batoum; 67, the Novorossisk port; 47, Sebastopol; 39, Taganrog; and not more than 38, those of St. Petersburg and Cronstadt.

The navigation of steamers is distributed among the separate seas so that 3 per cent of the number and 2.6 of the measurement fall to the White Sea; 56 and 40.4 per cent, to the Baltic; and 41 and 57 per cent, to the southern seas, the movement of navigation there being comparatively the greatest.

If the navigation be considered with reference to separate months, it will result that in 1891 the maximum for all the external seas with regard to the number of vessels as well as to their measurement fell to the month of August. In particular, the navigation of the White Sea began in May, and lasting to November, was most intense in June; of the Baltic, in August; and of the southern seas, in May with regard to the number, and in August, with regard to the measurement.

The principal ports were: those of the White Sea, the total number of vessels being 1,035, measuring 358,000 tons register; of the Baltic: the St. Petersburg-Cronstadt port, 3,046 vessels, measuring 1,954,000 register tons; Riga, 3,686 vessels and 1,848,000 tons; Libau, 2,648 vessels and 1,124,000 tons; Reval, 788 vessels and 482,000 tons; of the Black and Azov seas: Odessa, 2,223 vessels, measuring 2,604,000 tons; Batoum, 1,865 vessels, 1,598,000 tons; Taganrog, 1,446 vessels, 1,010,000 tons; and Nikolaev, 572 vessel, 658,000 register tons. Thus, according to the number of vessels, the most considerable port is Riga on the Baltic Sea; and according to the measurement of the vessels, Odessa on the Black Sea.

The data given relative to the navigation of the remote east show that, in 1891, 111 vessels entered Vladivostok, measuring 97,000 register tons; and Nikolaevsk on the Amour, 33 vessels measuring 19,000 tons. Besides these two ports, the vessels of the Volunteer Fleet enter also some other points on the coast of Eastern Siberia, namely: Dekastri, the Bay of Fossiet, Okhotsk, Aian, Ghizhiga-Udsk and others. This movement of Russian trade vessels is quite a new thing, and all the data give reason to suppose the possibility of a further development of the marine trade of Eastern Siberia.

TRANSIT TRADE.

Transit trade of foreign goods through the Empire.

The wares destined to an uninterrupted passage through the Empire are declared to be transit goods, in order to escape the payment of import or export dues, and to shorten in general the formalities relating thereto. Of course such kinds of wares as are not subject to any special duties either for the import or export, and therefore allowed to cross the frontier with less formality, may be carried through the Empire without being declared as transit goods, and so be marked in the returns of one customhouse as goods imported for interior consumption, and in those of another as Russian wares going abroad. Therefore, although some quantities of

duty-free wares are noted in the number of transit goods, yet a supposition may be made that a part of such wares is not reckoned among transit goods, namely, to some extent, grain and lumber.

Across European Russia in 1891 foreign transit goods followed the courses as below: *a.* from Roumania to Prussia; *b.* from Austria to Prussia; *c.* from Prussia to Prussia; *d.* from Prussia to Austria; *e.* from Prussia to Roumania; *f.* from Austria through Odessa to different foreign countries; *g.* from Roumania through Odessa to different foreign countries; *h.* from different foreign countries through Odessa to Roumania.

a. Trough Ungheny to Graevo, Mlava, and Sosnovitsy, various kinds of breadstuff cargoes, as well as fruit and nuts, have been brought, to an amount of 300,000 roubles paper. *b.* From Austria to Prussia, lumber, to the value of 1,100,000 paper roubles, was floated down the river Vistula; through Radzivilov to Graevo and Mlava also, some quantity of lumber has been brought; in the direction from Granitsa to Mlava cargoes of breadstuffs and various kinds of seeds, to the value of about 700,000 roubles paper, were carried by rail. *c.* Lumber to the value of 38,000 roubles was brought along the rivers Pissa, Narev, and Vistula. *d.* Trough Graevo and Mlava to Radzivilov herrings were brought, and through Graevo to Granitsa sacks for grain, which had been previously brought through Granitsa to Graevo, and thence sent on to Prussia without sacks. *e.* Through Graevo to Ungheny herrings were brought. *f.* Trough Volochisk to Odessa 163,000 pouds of lumber destined to go farther east have been brought; the lumber from Galitsia is carried this way chiefly in the winter. *g.* Trough Ungheni to Odessa 438,000 pouds of lumber; *h.* Trough Odessa to Ungheny an inconsiderable quantity of various goods has been carried.

During the same year foreign wares were imported to Finland, as transit goods across Russia, to the value of 89,000 roubles paper, the valuation done in Russia; of these, 200,000 pouds were kitchen salt, brought from the Baltic by the Neva and by the Ladoga Lake; the remainder was carried through Virballen, Sosnovitsy, Granitsa, and Reval to Finland by rail.

Through the Caucasus in 1891 for the Persian Government, transit goods, valued at 44,000 roubles paper, were carried; for the private trade, as has already been mentioned, the transit of goods from west to east is prohibited, and a special license must be obtained in every case.

Asiatic goods to the value of 1,700,000 roubles paper have been brought to Europe; out of which 700,000 pouds in Baku, and 500,000 pouds in Ousoun-Ada have been declared as transit wares; among the first prevail: silk, 12,000 pouds, and palm wood, 144,000 pouds; among the latter, wool, 98,000 pouds, and sheepskins (merloushki), 32,000 pieces.

Transit of Russian wares through foreign countries.

On the whole, in 1891, the Russian wares, carried as transit goods through the neighbouring countries, may be estimated at 300,000 roubles paper; out of these wares to the value of 148,000 roubles were brought through Austria, to the value of 141,000 roubles paper through Austria and Roumania, and to the value of 35,000

roubles paper through Prussia. The principal article of such trade was sugar, 31,000 pouds, which was carried from Novosselitsy to Ungheny by means of the foreign railways lying close to the Russian frontier. When the line now in construction upon Russian territory leading to Novosselitsy is opened, such transit trade across the neighbouring countries will of course stop. No need will exist also to carry by foreign railways dried plums, of which in 1891 were brought from Novosselitsy: to Radzivilov, 90,000 pouds, to Granitsa 42,000, and to Ungheny, 2,000 pouds. The transit trade through Prussia (13,000 pouds of wheat flour and 18,000 kitchen salt) bears rather the character of a frontier trade, which it is impossible to abolish completely by any measures.

Furthermore, the very peculiar mode of transit of Russian wares through foreign countries by Russian railways and steamboats should be mentioned; namely, the trade of European Russia with Russian Turkestan, in which the goods have necessarily to be carried through Khiva and Bokhara. In 1891 wares to the value of 16 million roubles paper were brought into Russian Turkestan, and wares to the amount of 16,7000,000 roubles paper were exported therefrom. To Turkestan there were brought manufactured goods, 689,000; unwrought metals, 175,000; sugar, 130,000; cotton yarn, 91,000; iron and like wares, 74,000; naphtha products, 42,000; glass wares, 18,000; lumber 19,000; trinketry, 7,000 pouds, et cetera.

From Turkestan there were exported: raw cotton, 1,433,000; wheat, 146,000; dried fruit, 126,000; raw hides, 75,000; raw wool, unwashed, 37,000; sheep skins, 23,000 pouds, et cetera. When Khiva and Bokhara will be included in the sphere of the general Russian customs regulations, there will be no need to reckon the above mentioned trade returns in the exterior trade; if the totals of this trade should thereby decrease, however the trade between the separate parts of the Empire will develop in still larger proportions.

LARGE COASTING TRADE.

The Russian wares sent from the Russian ports of one sea to such ports of another sea are not imported free of duty, if there were not observed certain custom-house formalities at their loading, as a prevention of free import of foreign goods into Russia. In 1891 the value of Russian goods brought from one sea to the other in the so-called large coasting trade was 18,300,000 roubles paper; namely: from the Baltic to the Black Sea wares were brought to the value of 10,100,000 roubles; from the Black Sea to the Baltic, to that of 5,500,000 roubles; from the White Sea to the Baltic, to 2,300,000 roubles paper; from the Baltic to the White Sea, to 300,000; and from the Black to the White Sea, to 100,000 roubles. Among the wares brought from the Baltic to the Black Sea (from St. Petersburg to Odessa for 6,400,000; from Riga to Odessa for 800,000; and from St. Petersburg to Nikolaev, for 1,600,000 roubles) various kinds of finished goods prevailed, such as, cast-iron wares, 23,000; iron wares, 220,000; steel wares, 106,000; machinery, 38,000; india-rubber wares, 6,500; paper, 57,000; cardboard, 50,000; flax and hemp wares, 10,000; cotton wares, 3,000; stearine candles, 34,000; and matches, 32,000 pouds; besides, this kind of coasting trade included 190,000 pouds of cement, 8,000 pouds of glue, et cetera.

Wares of a quite different kind were carried in the opposite direction, namely, from the Black Sea to the Baltic. In this case the prevailing goods were: raw sugar, 352,000; refined sugar, 45,000; kitchen salt, 3,700,000; tobacco in leaves, 123,000; grape wine in barrels, 40,000 pouds.

From the White Sea to the Baltic, fish were chiefly brought, namely 250,000 pouds, from the coasts of the Mourman to St. Petersburg, and from Archangel to St. Petersburg, 25,000 pouds. From the Baltic to the White Sea an inconsiderable quantity of different wares has been brought, such as, glass wares, cast-iron articles, iron, vegetable oil, refined sugar, cement, apothecary goods, soap, candles, et cetera. To the White Sea were brought from the Black: maize, 34,000 pouds; wheat flour, 15,000; salt, 15,000 pouds, et cetera.

SMALL COASTING TRADE.

The free transport of goods from one port to another of the same sea is allowed only to vessels under the Russian flag, the goods being of Russian origin, or such foreign wares on which the import customs duties have been already levied; in 1891 the amount of such goods was: at the White Sea, over 1,700,000 pouds; the Baltic, over 35,000,000; the Black and Azov ports, 119,000,000; and the Caspian, 157,000,000 pouds. With regard to the quantity of the goods transported, the small coasting trade may be compared to the turnover of the exterior trade, because it exceeds the figures of the foreign import, and is but little under those of the foreign export.

The chief interest presented by the small coasting trade is the fact that it aids the centralization of goods for export; it cannot be said, however, that it helps in the same degree the distribution of the wares brought from abroad to the points of consumption. As in the exterior trade the export exceeds the import, so also in the small coasting trade the movement is exclusively in one direction. To characterize the trade movement of the White Sea, it will be enough to mention that from Archangel there were shipped 434,000 pouds of rye flour; in this port 246,000 pouds of fish have been equally received; besides this, 108,000 pouds of salt and 325,000 of lumber, and still smaller quantities of other wares, have been transported.

Out of the total amount of goods transported during 1891 at the Baltic Sea, 12 million pouds have to be excluded as forming the weight of the materials brought from the Pavlovsk port to Libau for the building of a haven there; this cargo is accidental and may not occur in after years. Furthermore, of the remaining 23 million pouds, 6,300,000 fall to wood; 4,500,000, to lumber; 2,300,000, to cement; 1,300,000, to breadstuffs; and 800,000 to wares of cast-iron, iron, and steel. The principal points of arrival of the goods were: St. Petersburg, 7,000,000 pouds; Riga, 5,700,000; Libau, 16,700,000 (among which are the above-mentioned 12 millions pouds); and Reval, 2,400,000 pouds; the cargoes, with regard to the kind of wares, were distributed as follows: to St. Petersburg, wood 1,300,000 pouds and cement 1,100,000 pouds; to Riga, wood 2,900,000, and lumber 900,000 pouds; to Libau, wood 1,100,000 pouds; lumber 1,500,000 and cement 1,000,000 pouds; to Reval, wood 600,000, and lumber 900,000 pouds.

Lumber is carried: from the Pavlovsk port, 1,300,000; from Narva, 1,000,000, and from other places having no customhouses, 5,200,000 pouds. The cement is brought almost in equal quantities from Riga, 1,200,000, and from Port Kunda, 1,100,000 pouds. Besides the Pavlovsk port, the export from which is 13,700,000 pouds, and Riga, 5,400,000 pouds, there are almost no places with a considerable export; the loading is more equally distributed among the large number of the different points of the coast. With the development of the steam navigation on the Black Sea the traffic has already been specialized, and at present it is possible to denote the objects of the coasting trade already quite defined, namely: the transport of breadstuff cargoes to Odessa, the export of coal from Marioupol and Rostov-on-Don, of naphtha products from Batoum, the transport of the Crimean salt, the carrying of lumber and wood to Odessa and Batoum, the export of cement from Novorossisk.

Out of the 38 million pouds of breadstuff cargoes, 19 million or 50 per cent fall to wheat; 7,500,000, or 20 per cent to barley; 4,500,000, 12 per cent to rye, 2,900,000 over 7 per cent to maize; 1,800,000, about 5 per cent, to wheat flour; and 1,300,000 pouds, 3 per cent, to various kinds of groats. On the whole, 62,600,000 pouds were brought to Odessa in the coasting trade, and 15,500,000 pouds were carried from this port, to which about one-third of the whole turnover of the Black Sea coasting trade thus refers.

Among the imports the principal with regard to quantity were: wheat, 16,600,000 pouds; rye 3,700,000; barley 6,300,000; maize 1,800,000; on the whole, breadstuffs 29,900,000 pouds; kitchen salt, 7,300,000; lumber and wood, 3,800,000; coal 9,500,000; naphtha products 4,800,000 pouds.

The export from Odessa by the coasting trade was: iron 600,000 pouds; cast-iron iron and steel wares, 700,000; coal, 1,300,000; lumber, 1,300,000 pouds.

The breadstuffs are transported on barges towed up the mouths of the rivers (*limany*) Dnieper and Dniester; as may be seen, the return cargoes from Odessa are very inconsiderable. The goods sent from Odessa are chiefly destined to Batoum, and consist mainly of wares of Russian manufacture. The second place in the coasting trade with regard to the turnover is held by Kherson, through which grain and lumber cargoes are carried from the Dnieper to Odessa; the total amount of goods of its coasting trade despatched is 28 million pouds.

The turnover of the Taganrog-Rostov port reaches 17,200,000 pouds; 11,300,000 of export, and 5,900,000 pouds of import. The chief exports were: 6,500,000 pouds of coal; 700,000 pouds of fish; 300,000 pouds of wheat flour; 500,000 pouds of iron, and 400,000 pouds of cast-iron wares and the like. The principal imports were: kitchen salt, 1,200,000 pouds; and fish, 200,000 pouds. The next place with regard to the dimensions of the turnover is held by the Batoum port, the export being 8 million, and the import, 7 million pouds; the principal exports were naphtha products, 6,300,000, and raw cotton, 200,000 pouds; the imports, besides all kinds of finished goods, were: lumber, 2,400,000; wood, 300,000; coal, 400,000; iron, 300,000; cement, 200,000 pouds. Marioupol exports almost exclusively coal, namely 10,600,000 pouds out of the total 12,200,000 pouds. Novorossisk exports 1,200,000 pouds of cement. The greatest part of the coast points are engaged in the salt trade. The exports are from: Eupatoria, 4,500,000; Kerch, 2,500,000; Ochakov, 900,000; Ak-Mechet, 800,000; and from all the other points, 2,500,000 pouds. The imports of

salt are to: Odessa, 7,300,000; Rostov and Taganrog, 1,200,000; Nikolaev, 600,000 pouds; and to other points in smaller quantities.

In the coasting trade of the Caspian two currents may be at present noticed: the transportation of naphtha products from Baku to Astrakhan, and the carrying of Russian manufactured goods in the opposite direction. An active trade is now springing up also between Central Asia on the one side, and European Russia and Caucasus on the other, the junction being Ousoun-Ada. From Baku there were despatched 126 million pouds of naphtha and naphtha products; Astrakhan has received 122 million pouds thereof, out of which 9,400,000 pouds, raw naphtha, 24,900,000 kerosene and 87 million naphtha residues. The latter serve as fuel mainly for the steamers navigating the Volga, as well as for the heating of steam-engines on various factories, and locomotives.

With reference to quantity, grain must be regarded as second in importance among the other wares. In 1891, 3 million pouds thereof have been brought to Astrakhan. Over 1,300,000 pouds of various fish are brought to Astrakhan from different points. The cotton from Ousoun-Ada goes to Astrakhan, about 20 per cent, and to Baku; the Caucasian cotton goes from Baku to Astrakhan.

The final points of destination of the cotton are the factories situated in the Moscow and the Vistula regions, the routes of transport being either through Astrakhan and along the Volga to one of the final points of the net of railways, or through Baku to Batoum and thence by the Black Sea to Sebastopol. When the Petrovsk Railway is opened this latter course will be found more advantageous. Lumber is sent from the Volga to the Caucasian ports, on the whole, to the amount of 6 million pouds; wood is sent from the more southern ports of the same region to Baku.

Astrakhan furnishes the other points, and mainly Baku, with iron, over one million pouds. Nut and palm wood ware sent to Astrakhan, from 30 to 58 thousand pouds. From Astrakhan ice is sent to Baku.



CHAPTER XXV.

The Interior Trade and Fairs of Russia.

THE interior trade of a country is in general not easily defined; in fact, no country can boast of having accurate statistics upon the subject. Full data may be still less expected with reference to the land trade of Russia, occupying such a vast territory, exhibiting such variety in the economic life of its different parts, and in which the distances between the centres of production and the markets of consumption are so great. Accordingly, one must be satisfied with the little information characterizing the various sides of its multiform inland trade.

The principal questions arising in the investigation of the interior trade of a country, in answer to which more or less accurate data are desirable, are the following: 1. The object of the trade, that is, the quantity of wares and general values forming the trade of the country; 2. The amount of the trade returns in the interior of the country with regard to the said object, depending wholly on the amount of middling trade operations, which every object undergoes after its production and before its consumption; 3. The summing up of the trade factors or units, that is, trade firms; 4. The traffic of the goods in various directions, and by different ways of communication, according to the conditions of the proposal and sale; 5. Permanent and temporary markets at which the principal turnovers of the land trade are centralized. Then follow the questions about the average prices of the principal products, raw, half-manufactured and finished; about the freights in the land navigation; about the dimensions, kinds and conditions of the loan establishments helping the interior trade, et cetera.

There are almost no data in Russia referring to the first of the above mentioned questions; therefore, only approximate definitions *en masse*, or a simple enumeration, can be given here. The object of the Russian inland trade is formed by all its products with the exclusion of the part consumed by the producers themselves; it comprises all kinds of goods of the manufacturing, mining, and rural industries, gardening, forestry, cattle raising, fishing and hunting. Furthermore, in the turnover of the trade enter also the so-called exchange values (notes and due bills, and money itself, in as much as they are an object of banking

and broker operations. Finally, in that kind of trade are also reckoned the different agencies for the transport of goods and passengers, insurance companies, and the like.

Besides this, it should not be forgotten that all the goods entering into the foreign commerce are necessarily a part of the land trade. In fact, every pound of grain exported must go through many hands in the interior before reaching a foreign market; every article of import likewise forms an object of inland trade before going to the consumer. Of course, the total of the wares exported is included in the amount of the production, but all the wares imported, being brought to the markets as articles for sale, must be reckoned when the object of the land trade is defined.

Of the mass of the above mentioned articles of interior trade, there exist more or less definite data relative only to the manufacturing and mining industries, reckoned in 1890 to 1,656,000,000 roubles paper (Introduction, Volume I); to breadstuffs, oats included, reckoned in the same year to 1,885,000,000 pounds or 1,400,000,000 paper roubles; and to wares of foreign import, which according to the data of the tax collectors, amounted in 1890 to 416,000,000 roubles. The turnover of the railways, with regard to the transportation of freights and passengers, may be fixed according to their gross receipts, as they are chiefly composed of the sums paid for such services. According to the official statistics of the Ministry of Ways of Communication, the gross receipts of the whole net of Russian railways, Finland excluded, in 1890 were 284,500,000 roubles. The turnover of the steam navigation and other transport agencies may be fixed, according to the data of the Department of Trade and Manufactures («Statistical Results of the Rates and Assessed Taxes for the year 1889»), approximately at 239,000,000 roubles. Thus, the general sum for the transportation of goods and passengers amounts to 523 million roubles. The valuation of the turnovers of various insurance companies, as well as that of paper values and money forming the object of bank speculations, cannot be made, as no data thereon exist.

Thus, for the fixing of the object of the interior trade in Russia, there are only the following figures, reckoned approximately:

Product of manufacturing and mining industries	1,656,000,000 roubles.
Breadstuffs	1,400,000,000 »
Foreign imports	416,000,000 »
Turnover for the transport of goods and passengers	523,000,000 »
Total	3,995,000,000 roubles.

If the values of the products and turnover of other trade firms, as well as those of values and money forming the object of banking operations be added to this total, it will certainly greatly exceed the sum of the 4,000,000,000 given above.

With regard to the number of trade firms or commercial undertakings, and to the amount of their turnovers, there exists various and full information, owing to the statistical work of the Department of Trade and Manufactures referring to commercial and industrial enterprises. These works began with the establishment in 1885

of additional taxes: the income tax on joint-stock and share companies, the assessed tax on personal enterprises; the latter spread only since 1889 on all kinds of personal commercial enterprise, guild and non-guild, with the exclusion only of the very small huckstering and petty trades. The «Statistical Results of the Rates and assessed Taxes for the year 1889» includes all the guild and non-guild commercial undertakings, with the above-mentioned exceptions, as well as all joint-stock and share companies, with the exclusion of railway and mutual insurance companies; and it enumerates them by separate governments and districts, classifying them according to the different branches of trade, and fixing approximately the turnovers and profits of each of these branches, thus presenting a somewhat complete trade monograph of each government and district.

According to the data furnished by this work, the average number of guild commercial enterprises paying assessed taxes in 1889, was 129,411, and their total turnover 6,828 million, or 52,762 roubles of turnover per firm. The average number of the non-guild commercial undertakings paying assessed taxes was 230,540, and their turnover reached 516 million roubles, or 2,238 roubles per business firm. On the whole there were of guild and non-guild enterprises 359,951; and with the 23,000 freed this year from the assessed taxes, 383,000, with a turnover of 7,344 million roubles.

In reference to the 740 joint-stock and share companies, and companies based on mutual responsibility, the statistics of the Department of Trade and Manufacture give only their profit and not their turnover, which may be approximately calculated according to the amount of the profits. Taking as a standard that all the banking and general loan establishments belonging to the above-mentioned companies yield $\frac{1}{2}$ per cent of profit on the turnover, and that all the remaining companies, that is, insurance companies, forwarding agencies and other like companies, yield on the average 2 per cent of profit, it will result that the profits of the 563 banking and loan establishments are 30,680,000 and their approximate turnover 6,136,000,000 roubles*; and the profits of the remaining 177 firms, 11,430,000 roubles, their turnover being 575,000,000 roubles; thus, the total amount of business will be 6,711,000,000 roubles.

In this way, when the commercial undertakings and their turnovers are reckoned, the results will prove as follows:

	Number of under- takings.	Annual turn- over.
Personal guild and non-guild enterprises	383,000	7,344,000,000
Joint-stock companies, and those based on mutual re- sponsibility.	740	6,711,000,000
Total .	383,740	14,055,000,000 roubles.

* The State Bank, the State Bank of the Nobility and the Peasant banks, as well as other State loan establishments, are not reckoned herein. The figures showing the turnover of the joint-stock and loan establishments, as given here, are considerably lower than those given in the account books of some of the large Russian banking firms.

The commercial companies, with regard to their number, and especially to their turnovers, are very unequally distributed among separate governments. Those of St. Petersburg and Moscow, as well as those in which manufacturing is more-developed, have the precedence, as may be seen from the accompanying table comprising the most active governments in respect to trade.

GOVERNMENTS.	NUMBER OF COMPANIES (SHARE, GUILD AND NON-GUILD).	ANNUAL BUSINESS, IN ROUBLES.
St. Petersburg	18,857	4,647,000,000
Moscow	19,086	2,969,000,000
Kherson	10,918	1,447,000,000
Lithuania.	6,693	545,000,000
Warsaw	9,912	542,000,000
Kharkov	7,325	408,000,000
Kiev.	11,897	406,000,000

The distribution of the firms and of their turnovers shows no less variety with regard to the different branches of trade to which they belong. The more prominent of these branches, according to the number of the firms and the amount of their business, are the following.

BUSINESS FIRMS:	NUMBER OF FIRMS (JOINT-STOCK, GUILD AND NON-GUILD).	ANNUAL BUSINESS, IN ROUBLES.
Loan, banking, and commission establishments.	3,388	10,166,000,000
Trade in manufactured goods.	37,450	637,000,000
Trade in grain and flour.	16,681	481,000,000
Hotels, restaurants, buffets, drinking halls, inns.	103,080	263,000,000
Transport agencies, railways excluded. . . .	2,259	239,000,000
Wine stores, wine cellars.	19,245	211,000,000
Trade in metallic wares and machinery . . .	7,585	144,000,000
Lumber trade	5,839	108,000,000
Trade in ready-made clothes, hats, and fur articles	5,662	102,000,000

As regards the movement of goods according to the conditions of demand and sale, the data thereon are to be found in the yearly statistics of the Ministry of Ways of Communication. The information upon the subject, especially in reference to the railway activity, are given in these works somewhat fully, although they do

not always answer the problems of the trade and industry statistics. Persons interested in the matter are referred to the said works.

Finally, as to the markets on which the business of the land trade is centred, it should be mentioned that, with regard to the permanent markets, their turnovers, and the stores of different wares stocked thereon, there are but few and fragmentary data, showing only the storage of the goods prepared for export at the ports; and that of grain cargoes on the main wharfs, chiefly on the Volga basin during the close of navigation. About the temporary markets, that is to say, fairs, there exist more various and complete data; and as the trade at fairs is one of the characteristics of the Russian inland trade, this subject will be treated here separately.

THE FAIRS.

While fairs have lost almost every importance in Western Europe with very few exceptions, they still hold a prominent position in the interior trade of Russia. It is, however, very difficult to state their general turnover. At the end of the seventies a trial was made to fix the amount of the trade at the fairs, and the result showed that there were in all 2,825 fairs; their turnover, with the exclusion of the 110 of which no data existed, amounted to 577 million roubles of wares brought thereto, and to 377 million roubles of wares sold thereat, the number of tradesmen engaged in the business reaching 194,000. Of course these data cannot be looked upon as perfectly correct, but they give an approximate idea of the quantity of goods in traffic at the fairs.

Of the total number of fairs the greatest part, 82 per cent, bear the character of village fairs (bazaars); their chief business consists in the sale of various rural produce to the dealers by the peasants, and in the buying in return of the necessary stores and various articles needed in rural economy. The distribution of the fairs in the different regions of Russia is very unequal. The greatest number of the larger fairs falls to Little Russia and the Eastern region (governments of Kharkov, Poltava, Perm); the smallest number falls to the western region, where towns are more numerous.

Most of the fairs were established in far distant times; thus, for example, at the conflux of the rivers Mologa and Volga in the sixteenth century a fair of considerable importance existed, the traffic continuing for four months and bearing mainly the character of an exchange trade. Germans, Poles, Lithuanians, Greeks, Italians and Persians frequented this fair. The tradesmen exchanged ready-made clothes, tissues, leather, axes and crockery, for raw materials, and especially for honey. In the seventeenth century this fair ceased to exist. In the vicinity of Little Russia, during the seventeenth and eighteenth centuries, flourished the Svensk fair near Briansk, and the Korennaïa, near Kursk. Moreover, some of the now existing fairs of Little Russia operated with success even before the annexation of that country to Russia. The fair of Irbit was established in 1643, that of Nizhni-Novgorod only in 1817; before that time this fair was held in Makariev, and still earlier in Vassil-Sursk, where it had been established already during the reign of the Prince (Veliki Kniaz) Vassili Ioannovich. New and large fairs have not been founded of late; only

in 1886 a fair was opened at Baku; some new fairs have been also established in Siberia, and in the Russian Central Asiatic possessions.

The firm establishment of a trade held at fairs in Russia was mainly due to the lack of convenient ways of communication hindering the local dealers from buying the necessary wares at the points of their production, or in places where stores of the kind existed, as well as to the sparsity of the population, the feeble development of the loan system, and lack of capital. It should be also mentioned that the freezing of the water ways during the winter aided more the temporary than the permanent trade. All these circumstances incited the tradesmen to meet half-way at definite dates in order to exchange their goods, regulate their accounts, and strike new bargains. In general, the fairs afford an exclusive opportunity for the small dealers and hucksters to buy the necessary goods immediately from the manufacturers or large wholesale dealers without middlemen, and in the mean time the manufacturers have the opportunity to enter into close mercantile relations with the tradesmen and be better acquainted with the demands of the market.

The fair trade in Russia was also greatly helped by the protection evinced from long ago, by the Government with regard to it. Although formerly, in the seventeenth century, the trade of the fairs was not free from taxes, such as the toll, *tamga*, and others, yet owing to the interest taken in the establishment of fairs by monasteries they always enjoyed some franchises and protection. Moreover, the Government itself, previous even to the reign of Peter the Great, instituted fairs with the view of drawing thereto the trade of the neighbouring countries. Peter the Great also paid great attention to the fairs. In the Statute issued in 1721 the Chief Magistrate is enjoined to multiply fairs in towns and districts, «in convenient places, especially in such as possess water ways of communication», because these fairs serve to increase the fisc, to develop the trade and manufactures, and thereby promote the welfare of the people.

In 1753 all the inland customs duties were abolished, but as it referred to the trade in general no special advantage resulted therefrom to the fairs. In the reign of Catherine the Second, in 1775, a percentage tax on the capitals declared by the tradesmen «upon their honour» was installed, and the tradesmen of the two first guilds, by paying a certain per cent on their capital, received the right to trade over all Russia, including the fairs. However, the merchants of the third guild and burghers, having only the right to traffic in their boroughs, could not carry on the trade at fairs lying without the boundaries of the district, without paying a special tax for the privilege. Therefore, the number of merchants having no right to trade at the fairs duty free was considerable, and increased still more in 1812, when the same rules were applied to the peasants who carried on their trade according to special licenses of three categories, corresponding to the three guilds.

This state of affairs called forth complaints against the regulations laying a restraint on the commerce at the fairs, and the Government finding that such a restraint could totally ruin them, and thereby cause a considerable decrease in the revenues, as the shops belonging to the treasury might remain untenanted, resolved in 1814 to proclaim trade at all the fairs of the Empire free to all. By this law, the fair-trade was placed in a most favourable position, all the more so as until 1863 inhabitants of towns were not allowed to open shops in villages, where therefore very

few permanent shops containing necessary wares existed, because in the shops opened by peasants only a few articles were allowed to be sold. This abnormal state of affairs was changed in 1863 by the regulation allowing village shops to be opened by all kinds of dealers. This measure in no way damaged the trade at the fairs, which continued to attract numbers of merchants and local inhabitants, as the latter found more buyers for their products and the former had a greater choice in the making of their stocks. The fairs aided greatly the development of the trade in Russia, which did not possess at the time either a sufficiently large network of railways and telegraphs, or enough banking establishments. Thus, in the middle of the present century the fairs of Little Russia reached their highest development. Meanwhile the character of the fairs begins to change visibly, owing to the considerable development of the manufacturing industry in Russia.

Until the twenties, that is, until the issue of the tariff of 1822, considerable quantities of foreign manufactured goods were brought to the Russian fairs. Towards the end of the twenties and at the beginning of the thirties, however, Russian manufactured goods began to prevail at the fairs, where stores were organized by the manufacturers themselves. These goods enjoyed the largest sale at the fairs of Little Russia. As a consequence, such fairs and towns as were mainly dealing in foreign wares, as Niezhin, Krolevets, lost their importance; on the contrary, those nearly connected to Moscow began to gain in importance, for instance the fair of Kharkov.

However, the trade at fairs suffered many inconveniences. Those of Little Russia, as is known, bear the character of an ambulant market. In fact there exists a whole cycle of fairs following consecutively one after the other in the course of the year, at Kharkov, Poltava, Romny et cetera; therefore the wares must be carried from one fair to the other, unpacked and re-packed. According to the calculation of J. Aksakov («Fairs of Little Russia») some of the tradesmen had to do this over 20 times a year, and the goods were carried 2,400 versts on the average. Likewise many of the wares are carried from the fair of Nizhni-Novgorod to that of Irbit, thence to Ishym, Biisk, and back again. It is remarkable that notwithstanding the freight rates the prices of the goods at the remotest fairs differ very little from those at Moscow. This was chiefly due to the fact that, in selling their goods at all the fairs, the manufacturers and wholesale dealers set the prices on the articles not reckoning the expenses incurred by the transport of the goods to a certain fair but on considering the yearly turnover, covering the losses undergone at one fair by the profits of another. Of course, this was not a normal condition, and the permanent trade could not afford to compete with it, based as it was on more regular calculations. Besides, owing to the franchise granted to the fair-trade, a class of special dealers was formed, carrying on their trade by sending their goods only for the time of the free trade at the fairs in certain localities. All these circumstances impeded greatly the organization of a more regular trade on permanent markets, and lead to the conclusion that the privileged condition of the fairs finds no longer an excuse for its existence, all the more so, as with the construction of a large railway network, the establishment of telegraphs, banks, and forwarding agencies, the regular tradesmen have the possibility of getting their stock of goods immediately from the places of their manufacture.

In view of this, in 1882 a law was issued, according to which all the fairs

lasting more than 7 days, that is, bearing a purely commercial character, were subjected to a special ticket tax. Moreover, the fairs were divided into five categories. To the first the fair of Nizhni-Novgorod was referred, the tax being 100 roubles per ticket of first guild, 25 roubles for one of second guild, and 6 roubles a ticket for hucksters. To the second category, fairs with a duration of over 21 days were referred; to the third, fairs lasting from 15 to 20 days; to the fourth category, fairs of 8 to 14 days duration; and lastly to the fifth category, fairs not exceeding 7 days duration. The fair dues were determined in accordance with this classification. The fairs belonging to the fifth category were not subject to any taxation. Besides this, special trading licenses of two classes were instituted.

According to the most recent data, for 1889, the total number of fairs in Russia included one fair of the first category, the Nizhni-Novgorod, 47 of the second category, 59 of the third category, 291 of the fourth category, or altogether 398 different fairs. The fifth category included all the remaining fairs, to the number of 2,500. The total governmental revenue, brought in by the fair dues, reaches an average of 332,000 roubles. Since 1884 this revenue has not undergone any essential variation, although that brought in by the frontier fairs has somewhat decreased. In the meanwhile the revenue given by the trade dues has considerably increased. This fact partly shows that the settled form of trade has begun to develop at the expense of the trade at fairs. An examination of the trade done at the different fairs will now be considered.

The Nizhni-Novgorod fair lasts from the 15th of July to the 25th of August for wholesale trade, and to the 10th of September for retail trade. In the extent of its business this fair undoubtedly occupies the first place, not only among the Russian fairs, but also among those of the whole world. Strictly speaking, it was transferred to Nizhni-Novgorod in 1816, but its foundation dates very far back. Even during the existence of the kingdom of Kazan, the Russian merchants went to Kazan to trade at the market on the Arsk plain. Owing to the putting to death of Russian merchants at one of these fairs, the Grand Duke Vassili Ivanovich, forbade the Moscow merchants to trade at Kazan, and in 1524 instituted a special fair at the extreme boundary point of the kingdom of Moscow, at Vasillsoursk on the Volga, thinking that in this manner he could attract the trade which proceeded on the Arsk plain. But apparently this endeavour had no great success, and it was not until the beginning of the following century that a new fair began to flourish at Makariev, 80 versts below Nizhni-Novgorod. This fair was established with the most active participation of the Makariev Zheltovodsk monastery, at whose expense the various buildings were erected, and in general it may be said that in Russia the majority of the fairs were erected in the neighbourhood of monasteries. The fair continued to be held at Makariev until 1816, when after the fire it was transferred to Nizhni-Novgorod; and this is why the Nizhni-Novgorod is now known in Russia as the Makariev fair.

The geographical position of Nizhni-Novgorod was extremely favourable to the further development of this market. Situated at the junction of the Volga and Oka, it possessed an extremely convenient means of communication with the greater part of Russia. The upper course of the Volga passes through the central industrial region of Russia, which plays so important a part in the trade of the

Nizhni-Novgorod fair, and the system of water ways extends further right up to St. Petersburg, which is the chief consumer of the grain cargoes of the Volga. The middle course of the Volga and Kama give Nizhni-Novgorod the possibility of communicating with the Urals, which furnish the greater part of Russia with its metals, and also with Siberia, while the lower Volga and Caspian Sea connect it with Astrakhan, the Caucasus, Central Asia, and Persia.

The Oka flows along the southern boundary of the industrial zone, and along the northern borders of the corn-producing governments, and has thus long formed a link between Nizhni-Novgorod and one of the richest regions of Russia; and lastly, it is united with Moscow by a railway. There is not the least doubt that no other point could be found in the east of Russia, which in its geographical position could equal Nizhni-Novgorod for the purpose of a large trade. This explains how the Nizhni-Novgorod fair has attained, and continues to hold such a unique position in the interior trade of Russia. The range of business done by the Nizhni-Novgorod fair embraces nearly the whole of Russia. Only the south and west have no direct relations with this fair. The central industrial governments send their manufactured goods to the fair; the Urals, their metals; Siberia dispatches furs, skins, wax, oil, tallow; the Kama, salt; the Lower Volga, fish: the Caucasus, naphtha products and wine; Central Asia, cotton and lamb skins; Persia, fruits; China, tea; the south-western region, sugar; Little Russia, tobacco; the middle Volga governments, corn, timber and certain other goods; and Western Europe, manufactured and colonial goods, and also wine. A vast number of people congregate at the fair; on the average there are about 200,000 visitors.

Although in general the Nizhni-Novgorod fair has the usual Asiatic colouring yet in reality the Russian element predominates, and the Asiatics form a comparatively small percentage. The chief operations of the fair consist in the sale of manufactured goods to the merchants from the towns, who then distribute them over the whole of Russia. Moreover, the sale is chiefly carried on at first hand by the actual manufacturers. In this manner the fair supplies the great part of Russia with the chief articles of its consumption for the whole year. However, in recent years, owing to the growth of the Russian railway system, many of the merchants in the towns are in direct communication with Moscow, and the importance of the Nizhni fair in this respect has somewhat fallen. The Asiatics chiefly take manufactured goods in exchange for their wares, although they sometimes prefer to make the exchange in coin. Many raw materials are even dealt with at the fair, and these operations are participated in by foreigners. The greater part of the dealings at the fair are done on credit, and the bills are issued for 6, 9 and 12 months, or even longer terms, and frequently coincide with the periods of the Irbitzsk fairs. A very active retail trade is also done at the fair. In general it would be impossible to mention any dealings which are not carried on here, beginning from the largest and ending with the most insignificant retail trade. The fair acquires a still greater importance owing to the fact that its greatest activity corresponds to that moment when the state of the harvest is known, and upon which all the further economy of Russia depends. So also the result of the business for the expiring year is ultimately decided at the fair. Thus the dealings at the fair influence the whole further progress of trade in Russia.

Although the statistical data of the trade done at the fair are not in general quite trustworthy, still they are not void of interest, as they give an idea of the development of this trade and of the relative importance of one or another of its branches. The trade turnover of the Nizhni-Novgorod fair may be represented as follows:

1817--1826	32 million roubles	1847--1856	60 million roubles
1827--1836	35 » »	1857--1866	104 » »
1837--1846	48 » »	1867--1876	155 » »
1877	145 million roubles	1882	223 million roubles
1878	141 » »	1883	201 » »
1879	180 » »	1884	206 » »
1880	200 » »	1885	186 » »
1881	246 » »	1886	183 » »
		1887	193 million roubles
		1888	190 » »
		1889	186 » »
		1890	181 » »
		1891	168 » »

In the first year of its transfer to Nizhni, in 1817, the turnover of the fair reached 25 million roubles. If the figures for each period of ten years be examined, it will be found that the value of the goods brought to the fair increased from 32 million roubles in the first period to 155 million roubles in the sixth period, 1867 to 1876; then, after somewhat falling in 1877 and 1878, it again rose in 1879; and in 1881 reached its highest point of 246 million roubles; subsequently it again gradually fell with some inconsiderable fluctuations, and in 1891 it was only 168 million roubles. Naturally the institution of the fair dues in 1882 had a certain effect upon the trade of the fair, but the chief cause of the fall in its business is to be found in the construction of the new railways in the eastern portion of Russia, and of the Transcaspian line, which gave a possibility of carrying on relations with Central Asia almost throughout the year. It is worthy of remark, the general turnover of the fair does not in general vary much in one direction or another. This is due to the fact that, with the vast region covered by the trade of the fair, it cannot happen that all the localities should simultaneously be in favourable or especially unfavourable conditions of harvest. Thus, even in 1891, when the harvest was unprecedentedly bad in Russia, the turnover of the fair fell comparatively little, thanks to the advantageous conditions of trade in Siberia, the Caucasus, and the Don.

The first place at the Nizhni Fair is occupied by cotton goods, as seen in the Table on the next page. In 1890 to 1891 their average value was 25 million roubles, which was exactly that for the period 1868 to 1872, and now forms about 14 per cent of the total value of the goods brought to the fair. The goods are chiefly supplied from Moscow, Ivanovo-Voznesensk, and St. Petersburg, and in a smaller quantity from Lodz. The business done in other articles depends to a considerable extent upon the more or less favourable sale of cotton goods. The Volga governments, Caucasus, Don, Siberia, Central Asia and Persia are generally the chief buyers of this class of goods. As the value of cotton goods brought to the fair has not in any way increased since the period, 1868 to 1872, although the Russian production of such goods has made considerable progress, it is impossible not to conclude that the cotton trade at the Nizhni fair has undergone some variation, and it must be attributed to the fact that, with

the development of the railway communication, many parts of Russia have been brought into direct relations with the centres of production.

In passing to an examination of the present position of the trade of the Nizhni-Novgorod fair, as regards the different species of goods, the following table including for the sake of comparison the figures for the five-years period, 1868 to 1872, which may be regarded as normal for the internal trade of Russia is introduced.

	AVERAGE VALUE OF GOODS BROUGHT TO THE FAIR.	
	1868—1872.	1890—1891.
	Roubles.	Roubles.
Cotton and calico goods	25,000,000	25,000,000
Wool and woollen goods	17,000,000	15,000,000
Linen and flax goods	3,500,000	4,200,000
Silk and cotton-silk goods	7,000,000	5,500,000
Furs	7,000,000	8,500,000
Skins and leather goods	5,500,000	7,500,000
Metals and metallic articles	10,000,000	22,000,000
Fish goods	4,000,000	5,300,000
Sugar	3,700,000	2,800,000
Tea	8,400,000	14,600,000
Foreign manufactured goods	3,400,000	} 2,400,000
» wines	2,100,000	
Russian goods in general.	123,000,000	144,000,000
Bokharian and Khiva goods	3,000,000	6,000,000
Persian goods	3,100,000	2,500,000
Chinese goods	8,400,000	14,700,000
Western European and colonial goods, dyes, pigments and medicinal preparations . .	20,000,000	7,300,000
Total amount on sale	149,000,000	174,500,000
» » sold	130,000,000	166,000,000

Woollen goods were brought to that fair, to the value of 15 million roubles, in 1890 to 1891, and to 17 million roubles in 1868 to 1872. A certain although small amount of these woollen goods go to Kiakhita in exchange for Chinese stuffs. There is a somewhat considerable amount, from 500 to 600 thousand pounds of wool, brought to the fair, a large proportion of which is bought for foreign markets, including America.

With respect to other classes of goods, the increase in the amount of furs and hides may be partly ascribed to the increased demand abroad. Then, the increase in the trade in metals and metallic goods is explained by the increased demand for these goods in the interior of Russia, and by the growth of the production of the Ural works in recent years. So also, the amount of tea brought to the fair has also

increased, owing to the constant growth of the demand in Russia. The tea is brought to the fair, both by land through Kiakhta, and by sea through Odessa. In former times, until the beginning of the sixties when tea was not transported by sea, the tea trade of the Nizhni-Novgorod fair was of far greater importance, and almost the entire subsequent course of the business of the fair depended upon the fall of the tea trade. Now this trade has ceased to play the prominent part it formerly did, because over three-fourths of the tea does not pass through the fair.

In recent years certain new classes of goods have made their appearance at the fair, which in former times played quite a secondary part, as for instance Caucasian wine, kerosene, naphtha refuse. But at the same time Caucasian madder, which in the fifties and sixties played an important part among dyes, has now almost disappeared from the market. This trade has now entirely ceased in the Caucasus, owing to the competition of the naphtha dyes. A great falling off is also observable in the foreign goods, and especially of wines, which are every year receding more and more before the Russian wines. The increased trade in Bokharian and Khiva goods may be partly ascribed to the increased importation of cotton, which however now chiefly goes direct to Moscow and Lodz without passing through the fair. But the chief reason for the increased trade with these two countries, is the increased importation of lamb skins, wool, and certain other Central Asian goods. The trade done in Persian goods at the fair has somewhat decreased, but it must not be concluded from this that the Russian trade with Persia has fallen; on the contrary, since the closing of the Transcaucasian transit, the Russian relations with Persia have grown considerably, especially in respect to sale.

The Irbit fair is held at Irbit in the government of Perm, between the 1st February and the 1st March. Notwithstanding the fact that Irbit is situated outside the chief trading route between Russia and Siberia, the Irbit fair has acquired a prominent position in the Russian trade. It is here that Siberia supplies itself with cotton and other goods for the whole year, and this fair forms the centre for the chief Siberian goods, such as furs, skins, fish, bristles, horse hair, honey, wax, butter, hemp seed and linseed, and for Chinese and Asiatic goods, such as tea, silks, camels hair, et cetera. Many goods are sent here direct from the Nizhni-Novgorod fair, and remain unpacked, in which form they are also sold. Many of the Siberian goods are sent to Nizhni in the same shape. The price of the Russian goods, which are chiefly from Moscow, is calculated plus the cost of transport, but very often a certain deduction is made.

The Irbit fair was founded in 1643. Up to the twenties of the present century its trade did not exceed two million roubles. At the end of the thirties it reached 10 million roubles, and from that time, it began to grow rapidly. In 1863 it amounted to 50 millions. In the following years it fluctuated between 40 and 50 million roubles, and in recent years was as follows:

1887	.	.	.	.	56	million	roubles
1888	.	.	.	.	57	»	»
1889	.	.	.	.	49	»	»
1890	.	.	.	.	46	»	»
1891	.	.	.	.	45	»	»
1892	.	.	.	.	34	»	»

The number of visitors to the fair amounts to 100,000 persons; hence it will readily be understood what an animation this fair gives to the town of Irbit, whose fixed population does not exceed 5,000. Many of the houses remain closed during the year, and are only opened during the season. Large dealings are made at the fair for the delivery of Siberian grain and other goods to the north-eastern governments of Russia. Many of the goods are left at Irbit until the opening of the navigation permits their being transported by water. The closing of the Irbit fair depends upon the fur trade; if this business is not favourable the furs are dispatched to Moscow. In recent years the fair of Irbit has somewhat declined, as a portion of its trade has passed over to Tumen, which has the advantages of being the centre of the steam river communication, and of avoiding the transport of the goods to Irbit, and back. Besides this, the construction of the Siberian Railway will also reflect unfavourably upon the Irbit fair, as the Siberian merchants will find it more profitable to secure their goods according to their requirements at any time of year, than to supply themselves for the whole year as is now done.

The trade done in different classes of goods is as follows.

G O O D S.	AVERAGE FOR 1868—1872.	AVERAGE FOR 1890 *.
	R o u b l e s.	
Cotton goods	11,000,000	15,000,000
Woollen goods	3,300,000	3,100,000
Sundries	2,100,000	3,600,000
Furs	3,300,000	2,300,000
Tea	2,100,000	5,200,00

Foreign goods are brought to the fair to the value of 500,000 roubles, including chiefly, cotton, woollen, and silken goods, wood oil, indigo and dry goods. The chief Siberian goods dealt in by foreign merchants are furs.

The chief fairs of Eastern Russia, besides these, are the Sbornaya, Menzelinsk, and Ivanovsk fairs.

The *Sbornaya* fair is held at Simbirsk during the first and second week of Lent. Its trade in 1868 to 1872 amounted to 6,600,000 roubles, and in 1891, to 6,500,000 roubles. In former times this fair supplied the governments of Orenburg, Ufa and Samara. But now, since the construction of railways, its region has contracted; but it is still kept up, owing to the absence of railway communication in the surrounding districts. The chief object of trade here, as at other fairs, is cotton stuffs. This fair has also an important influence upon the ensuing grain trade, after the opening of the navigation upon the Volga; as among other things the prices of grain and rates of freight are decided at this fair.

The Menzelinsk fair is held at Menzelinsk in the government of Ufa, from the

* 1890 is chosen for comparison as being more normal.

26th of December to the 11th of January. In 1868 to 1872 its trade amounted to 6,300,000 roubles, and in 1890 to 1891 to 4,600,000 roubles. In general this fair is losing its importance owing to the extension of the railways to Zlatoust. Besides cotton goods, a considerable quantity of skins are sold at this fair.

The Ivanovsk or Krestovsk fair is held in the village of Masliansk, in the Shadrinsk district of the government of Perm, during the month of August. The value of the goods brought to the fair in 1868 to 1872 was 5,600,000 roubles, and in 1890 to 1891, 5,800,000 roubles. The chief objects traded in are the same as at the Menzelinsk fair. Besides, owing to the proximity of the Tartars and Kirghiz, certain Central Asian goods are brought to this fair.

Among the Siberian fairs the following should also be mentioned. The Winter-Nikolsk fair at Ischim, which is held from the 1st to the 25th of December. Goods to the value of 4,600,000 roubles were brought to this fair in 1891. The Konstantinovsk fair, held at Akmolinsk at the end of May and beginning of June. The Petrovsk fair at the station of Atbasarsk in the Akmolinsk province. The Tainchikoulsk fair held in the district of Petrovsk in the Akmolinsk province. These fairs owe the chief importance to their cattle trade. The cattle are brought from the neighbouring provinces and from the Central Asian Khanates. Besides which, a somewhat large amount of Bokharian goods are brought from Central Asia, for sale to the Kirghiz. The trade done at the Troitsk and Orenburg bartering yards is of the same character. The goods brought to the first named have a value of 3,600,000 roubles.

The chief fair of the Transbaikal province is that of Verkhneoudinsk. The value of the goods brought to this fair in 1891 amounted to 1,080,000 roubles. The chief fairs in the province of Irkutsk are the Rozhdestvensk and Nikolsk; in the province of Yakutsk, the Yakutsk fair, which is held from the 10th of June to the 1st of August. The value of the goods brought to this fair amounts to 1,300,000 roubles. Besides these there are several other fairs, whose trade exceeds one million roubles, both in eastern Russia and Siberia.

A large number of fairs are held in the governments of Saratov, Samara, Tambov and Voronezh, and although their accumulated trade is of considerable dimensions, still none of them are particularly large. In May a spring fair is held in the government of Astrakhan at the Akhounsk farm of the Interior Khirgiz horde. This fair does a large cattle trade, amounting to 2,600,000 roubles.

In northern Russia the only fair worthy of mention is the Margaritinsk fair held at Archangel in September. The chief objects of trade, besides manufactured goods, are fish and furs, skins, and the like. The value of the goods brought to the fair in 1890 reached 726,000 roubles.

In the central industrial governments there are not any large fairs. The most prominent is the Rostovsk fair held at Yaroslav. The value of the goods brought to this fair in 1890 was about 600,000 roubles. There are also no large fairs held in the western region and in Poland. The only one worth mentioning is the Lenchna fair in the government of Lublinsk. The value of goods brought to this fair amounts to one million roubles, the greater part of the trade being done in live stock.

The Ukraine fairs have long flourished in Little Russia. Before the union of this region to Russia, a whole series of fairs used to be held at Krolevets, Romny and Nezhin, where the Great Russian, Polish and Little Russian merchants, and even

Greeks, Volokhi and Germans from Gdansk, used to trade. Some of these fairs have continued in existence to the present day. When the Novorossisk region was joined to Russia, the fairs moved towards the South, in consequence of which certain of the former began to decline, and new ones to come into existence, in localities further to the south, as at Kharkov and Poltava. The firm establishment of these fairs was not a little assisted by the development of the Russian manufacturing industry, whose products little by little supplanted foreign goods, which were formerly imported overland. The chief fairs of the Ukraine are as follows:

LOCALITY OF FAIR.	NAME AND TERMS.	BUSINESS DONE, IN ROUBLES.	
		1868—72.	1891 *
Kharkov . .	Kreschensk from Jan. 6th to Feb. 1st	8,500,000	1,500,000
Romny . .	Masliansk > Feb. 10th to March 1st.	3,000,000	2,500,000
Romny . .	Voznesensk > 4th Wednesday after Easter to ten days after Ascension.	2,200,000	1,700,000
Kharkov . .	Troitsk > June 1st to June 10th.	2,900,000	9,000,000
Poltava . .	Ilinsk > July 16th to the beginning of August.	1,500,000	2,800,000
Kharkov . .	Ouspensk > August 15th to Sept. 1st	2,500,000	8,000,000
Romny . .	Alexandrovsk > August 30th to Sept. 13th.	3,600,000	1,300,000
Kharkov . .	Pokrovsk > October 1st to Nov. 1st.	5,300,000	10,000,000
Romny . .	Michailovsk > October 8th to Nov. 15th	—	2,200,000

All these fairs, following one after another through the entire year, are closely connected, and the goods which remain unsold are frequently passed on to the following fair, and even the payments are also passed from one fair to another. At the present time, however, perpetual stores have been erected at Kharkov and Poltava, and the former character of these fairs has somewhat changed. The chief business is done in manufactured goods, which amount to 58 per cent on the whole turnover. The trade is chiefly carried on by the manufacturers, to whose share 75 per cent of the whole trade falls, the remaining 25 per cent falling to merchants. These fairs form a perfectly separate group, without almost any connection with the remaining fairs, although the same manufacturers and wholesale merchants take part in them as at Nizhni-Novgorod, but the goods from the latter are not transported to the Ukrain fairs, and vice versa.

At the present time the largest trade is done at the Kreschensk fair at Kharkov. It moreover always occupied the most prominent position among the Ukraine fairs, and chiefly served for the sale of the summer kinds of cotton stuffs. In the fifties and sixties the goods were still brought to the fair in carts, whose number exceeded 100,000. At the present time the sale of goods at this fair amounts to 15,000,000 roubles; that is, it has almost doubled during the last twenty years. The

* This table gives the value of the goods sold, as there are no full data for the value of the goods brought to the fairs of the Ukraine.

Ilinsk fair at Poltava is just the opposite in this respect, for its trade has fallen from 15 million roubles to 2,800,000 roubles. Although 1891 was an exceptionally bad year for this market, but in general the merchants are always complaining of its decline. An yet in 1874 its turnover amounted to 22 million roubles. This decrease in the trade of the Ilinsk fair is explained by the central position of Kharkov compared with Poltava, and greater convenience of Kharkov for trading purposes. Nevertheless the trade of the Kreschensk fair has also fallen compared with what it was in 1873, when it amounted to 22,500,000 roubles. The Kreschensk fair is the place of meeting for all the merchants of Little Russia, and also for many from the governments of Kursk, Voronezh, Ekaterinoslav, the Crimea, Caucasus, Don, and certain other localities. The Kreschensk fair bears more the character of a fair for manufactures than any of the other Ukraine fairs, as 50 per cent of its trade is done in manufactured goods from Moscow, Ivanovo-Voznesensk, Poland and St. Petersburg. A large trade is also done in leather, and boots and shoes, which are brought from Moscow, Eletsk, Kursk, Kimry, St. Petersburg, and other localities, and also in sheet iron and copper brought from the Urals. The adjacent governments send the following chief goods to the fair: wool, sheep skins, untanned hides, butter, tallow, honey, feathers, down and bristles. The results of the Kreschensk fair reflect themselves on the business of all the other succeeding Ukraine fairs.

The Ilinsk fair has a similar character. This fair was formerly held at Romny, and it was transferred to Poltava with a view to increasing the importance of the government town of Poltava; and it also had the effect of increasing the trade of the fair, as its transfer to a more southern point fully corresponded to the general direction of the trade, in virtue of the importance gained by the Novorossisk region. Its turnover began increasing considerably from the first year of its transfer in 1853. The chief importance of the Ilinsk fair is due to the buying of tissues for the winter season. Hence, a brisk trade was always done in cloths and other woollen stuffs, and furs, and in this respect it has always surpassed the Kreschensk fair, which dealt chiefly in summer tissues.

The Troitsk fair is the chief wool fair in Little Russia. Wool from the governments of Kharkov, Poltava, Kherson, Ekaterinoslav and Tauride, is brought to this fair, chiefly in an uncleaned state. In 1889, 410,000 pouds of wool were sold to the value of 3,500,000 roubles. The entire success of the fair depends upon the wool trade. The wool is chiefly bought for Moscow, Poland, and Klintsy, as well as by foreign merchants.

The Ouspensk fair has also the predominating character of a wool fair, although the trade done is not so considerable as at the Troitsk fair, being 1,470,000 roubles in 1889. The chief trade is in the wool which remains unsold at the preceding fairs, and also in washed wool from the Kharkov and Belogorodsk wool-washing establishments.

The Pokrovsk fair deals chiefly in manufactured goods, which in 1889 were brought to the value of 5,000,000 roubles. Wool was also sold to the value of 500,000 roubles. The sale of tanned hides also plays an important part in this fair. The remaining fairs of the Ukraine are of a secondary importance.

The Korennaya fair is held about the ninth Friday after Ascension day, and lasts twenty days. It was formerly held on the Korennaya plain near Kursk, but is

now held at Kursk itself. This fair dates from the XVII century and it was especially important at the close of the eighteenth century, when there were over a thousand merchants in Kursk. Its chief trade was abroad. Besides foreign, large quantities of the following goods were bought by Moscow: honey, hemp, tallow, wax, hempseed oil, bristles, horned cattle and horses. Coming in contact with Little Russia, the Korennaya fair was at the same time connected with the Makariievsk fair, and through it with the Irbit fair. Kursk was then the central point between the west and east of Russia, and between Moscow and the south. After the union of the Novorossisk region, the trade moved further to the south, and the centre of this trade passed over to Kharkov; and the Korennaya fair has now lost all its importance, especially since Kursk has been united to Moscow by a railway. In 1891 the value of the goods brought to the fair amounted to scarcely 850,000 roubles, while in 1868-72 it amounted to 5,600,000 roubles.

The Contract fair is held at Kiev from the 5th to the 26th of February. The trade done is really small, but now it has an importance to the entire south-western region, owing to its coinciding with the meetings of the agriculturists, sugar manufacturers, and other merchants and manufacturers at Kiev. During this period various dealings are done in land, corn, sugar and building contracts.

Besides these fairs in the south of Russia, the following have a certain importance. The Rozhdestvenno-Bogorodsk fair, at Rostov-on-Don, the Georgievsk and Semeonovsk fairs at Elizavetgrad, the Petropavlovsk fair at Yarmolinsk in the government of Podolia, and the Bakhmut fair at the town of that name. In general, trading at fairs is somewhat extended in the governments of Ekaterinoslav, Tauride and Kherson, although there are no particularly large fairs. The Urupinsk, Krivorozhsk, and Razdorsk fairs in the Don province, deal chiefly in cattle.

The principal horse fairs are those at Balta in Podolia, Lenchno in the government of Lublin, Berdichev in the government of Kiev, Nizhnedevisk in the government of Voronezh, and certain others. Besides those already mentioned, the following wool fairs are of no little importance, at Kakhovka, Bakhmut, Rostov-on-Don, and Warsaw. The entire importation of wool to the Warsaw fair amounts to 70,000 pouds, chiefly washed wool. Besides local buyers, foreigners also come to this fair. In September there is a special fair held at Warsaw for trade in hops.

The following conclusions may be drawn from the preceding review of the Russian fairs: 1. That the growth of the fair-trade in Russia was chiefly assisted by the absence of convenient ways of communication, and that the closing of the river ways during several months of the year was more favourable to the growth of a fair-trade than a settled one. 2. That the fair-trade is generally in a transitional condition, and that certain fairs are even on the decline; while the settled trade, taking advantage of the perfected ways of communication and especially of the railways, is gradually developing at the expense of the fair-trade. 3. That the Nizhni-Novgorod fair can hardly lose its importance, although it has stopped in its growth, owing to the special position which it occupies in the economic life of Russia.



CHAPTER XXVI.

The Consumption of fuel for Industrial purposes.

IN Russia both vegetable and mineral fuel are used in the industries. The first includes wood, peat and straw, and the latter, the various kinds of coal from anthracite to lignite, and also naphtha and its products. In some localities fuel of animal origin, namely dried manure, is also used, but as it nowhere has any industrial importance, it will not be mentioned further.

No so long ago, when the manufacturing industries were inconsiderable and the railways few, the question of fuel did not play an important part in Russia, and the works and factories were generally erected in the proximity of forests, whose exploitation was easy. Owing to the then existing views upon the economic importance of fuel, the then existing policy did not in any way hinder the importation of all kinds of fuel from other countries, and thus evoked a more energetic exploitation of combustible materials within the limits of the Empire.

The chief force of the Western European industry, coal, whose production in Great Britain and on the Continent increases every year, was let into Russia free of duty; thanks to which, in many places and especially near the European frontier, many Russian industries were supported exclusively by foreign coal. It was frequently cheaper than the Russian fuel, which in the absence of convenient means of communication did not receive a wide application. If to this be added the freight policy of certain of the railways, which took upon themselves to transport coal from the frontier under more favourable conditions than from the interior, it will be readily understood why the Russian coal trade has developed so slowly.

The change in the Russian customs policy, directed towards the protection of the home production, had a favourable influence upon the branch of industry under consideration. The brisk development of industrial enterprise, combined with the increased goods traffic upon the railways and water ways, which have been distinctly observable in recent years, reflected themselves in a considerable increase in the demand for Russian mineral fuel. However, notwithstanding the great strides

made by this industry, which will be afterwards proved by figures, the chief resource of Russia still remains vegetable fuel, which is more used than any other in every class of Russian industry. Although vegetable fuels in the form of wood, charcoal, peat and straw, form the predominating combustibles in Russia, yet unfortunately, owing to the unsatisfactory registration of the yield of wood and peat from the State and private lands, there is no possibility of even approximately determining the total amount consumed as fuel. The consumption of straw, which forms the chief fuel in the grain-bearing steppes, is still more difficult to determine, although hundreds and thousands of portable engines, employed in the thrashing of the grain, consume huge amounts of this fuel. These engines, which, from their class of work, are moved from place to place about the steppes, cannot have a cheaper fuel than straw, which generally has no value at the place of its production. Not to speak of the steppe region of the Northern Caucasus, which is deprived of any other kind of fuel, even the rich coal-bearing province of the Don Cossacks exclusively employs straw as fuel in the agricultural portable engines. In some instances even factories find this fuel the more profitable.

Neither can the consumption of vegetable fuel in Russia, vast areas of which are thickly covered with forest, be determined from the data of its transport by rail and water, as the chief mass of the wood, charcoal, straw and peat, is transported by carts, and does not fall to the lot of those transport routes where an account is registered. However, in the absence of other data, it may be well to cite the totals of the transport of these materials by rail and water.

The railway returns only treat of the transport of wood fuel, which during recent years was as follows:

1884 — 157,530,000 pouds.	1888 — 150,599,000 pouds.
1885 — 145,107,000 »	1889 — 158,580,000 »
1886 — 143,117,000 »	1890 — 151,526,000 »

The chief railways by which the wood is transported are: the Moscow-Brest 28.3 million pouds, the Orel-Vitebsk 25.9 million pouds, and the Nicholas Railway 17.1 million pouds; that is, almost half of the whole transport of wood by rail. The wood transported by the above mentioned railways is chiefly directed towards Moscow, which in 1890 received 55.5 million pouds. If it be taken into consideration that wood, as a comparatively cheap fuel, cannot bear a distant transport in carts, and that the near neighbourhood of Moscow cannot offer a large quantity of this fuel, and if the water transport of 3.2 million pouds on craft and rafts be added to the transport by rail, then it is found that the consumption of wood in Moscow does not exceed 60 million pouds, which, with its large population and manufacturing industries, must be owned as very inconsiderable. But this is explained by the fact that Moscow has in recent years begun to prefer mineral fuel, in the form of coal and naphtha, to vegetable fuel. The remainder of the wood is distributed among the other towns of the Empire.

The returns of the water transport of wood fuel only concern European Russia, with the exception of Finland, Poland and the Caucasus. According to the returns of the internal water ways for 1890, altogether 138 million pouds were

transported by craft and 69.7 million pouds on rafts, or altogether 207.7 million pouds. The greater portion is transported through the basin of the Neva, together with lakes Ladoga, Onega, and Ilmen through which 124.6 million pouds were transported by craft and 49.4 million pouds by rafts, or 90 per cent in the former, and 70 per cent in the latter instance. Altogether 28.2 million pouds were transported through the basins of the Dnieper, West Dvina, Nieman and Vistula, the greater part being transported on rafts. There were 3.9 million pouds registered for the basins of the Don, Dniester and Narova. Thus the Neva appears as the most important route for the transport of wood fuel. Altogether 92.5 million pouds of wood fuel were floated down this river. Out of this amount St. Petersburg receives 81.4 million pouds; Schlüsselburg and Sheremetevka, 1 million pouds; and the remaining stations, 10.1 million pouds. The transport is exclusively by craft. St. Petersburg offers the largest market for wood fuel transported by water, as it consumes 38 per cent of the wood transported by all the internal water ways of Russia. Among other towns which play an important part in this transport, mention may be made of the following: Kiev, which receives 11.5 million pouds; Kazan, 10 million pouds; Ekaterinoslav, 10 million pouds; Tver, 7.8 million pouds; Kineshma, 5.7 million pouds; Saratov, 5.4 million pouds, and Nizhni-Novgorod, 5.2 million pouds.

The coasting transport of wood fuel is only of importance for the Baltic and Caspian seas. By the former, 4,811,000 pouds were transported, and by the latter 1,463,000 pouds. The chief points of consumption along the Baltic Sea are Riga, 1,546,000 pouds; St. Petersburg, 1,139,000 pouds; Libau, 1,109,000 pouds; and along the Caspian, Baku which receives 1,265,000 pouds from Lenkoran and Astara. On the Black and Azov seas the chief points of consumption are Odessa, 344,000; Batoum, 276,000; Kertch, 196,000; Nicolaev, 193,000, and Sebastopol, 103,000 pouds, which are chiefly furnished by the Black Sea coasts of the Caucasus, from Soukhoun 361,000; Poti 287,000, and Gelendzik, 158,000 pouds. The coasting transport of wood along the White Sea is of no importance.

In speaking of the transport of wood fuel, a few words should be said about the importation and exportation of this material; but direct data are wanting, as the importation of wood fuel is included under the general category of «timber goods of all kinds not especially mentioned», and its amount is given together with other analogous goods. As regards the exportation only the value of the wood fuel is given, without mentioning the amount, and this total value does not exceed 400,000 roubles. A certain insight can be gained from the railway returns, which show that 7.8 million pouds of wood fuel are dispatched to the ports of the Baltic Sea, 2.2 million to the Black Sea, and 0.3 million pouds to the Prussian frontier overland. From this it may be gathered that the Russian export and import of wood fuel is not of great importance.

Notwithstanding the vast extent of the peat bogs of Russia, which cover more than 100,000 square versts, to a depth of over 1 sagene, peat has everywhere only a local application as fuel. Endeavours made to extend the peat industry, that is, to organize its exploitation, sort, dry and press it, have only met with the desired success in certain places; and therefore the working of this combustible has almost everywhere a purely accidental character, and the amount of its production does not correspond to

the actual stores. This may partly be explained by the fact that the exploitation of peat has to be carried on in the summer, and the people are unaccustomed to it, while the use of wood has become general. The largest working of peat is carried on in the governments of Moscow, Vladimir, Nizhni-Novgorod, Riazan, Tambov, Kiev, Kharkov, Kursk, and Orel, and also in some of the western and Baltic governments. These peat bogs belong to the State, and to private individuals; the former keeps a regular account of the production of peat, while the latter do not keep any account whatever. From certain data it may be concluded that the central governments produce from 40 to 45 million pouds of peat, and the western and Baltic governments, 15 million pouds, or altogether 60 million pouds a year. As this combustible is chiefly employed at factories and works, and also upon railways, the most important points and the amounts of its consumption, will be mentioned hereafter.

The data respecting the consumption of straw are even less satisfactory than those concerning peat, and to what has been already said there may be added only very little more. Until the sixties straw was used as fuel only in peasant homes; but with the development of steam thrashing it grew to be the predominant fuel for the portable engines in large households of rural economy. In the steppes, and most of the Chernoziom governments of Russia not rich in wood, or distant from the localities where mineral fuel is extracted, straw plays a conspicuous rôle as fuel. As no data exist with reference to the quantity of straw consumed in this way, it remains only to point out the respective qualities of the different kinds of straw. Flax straw, containing the largest quantity of carbon and hydrogen and giving a small amount of ash, is preferred to all other sorts; next follow the rye and wheat straw; and the last place is held by the buckwheat and millet straw.

More full statistical information exists with reference to mineral fuel, that is, coal and naphtha. Those relating to the extraction and consumption of coal are as follows.

Y E A R S.	HOME PRO- DUCTION.	IMPORT.	EXPORT.	TOTAL AMOUNT OF COAL IN RUSSIA.	SATISFAC- TION OF WANTS BY HOME PRO- DUCE.
	P o u n d s.				Per cent.
1881	213,258,477	—	—	321,549,580	81.2
1885	260,577,779	106,343,000	—	366,738,637	71.0
1886	279,393,439	107,090,000	107,090	386,203,738	72.0
1887	276,778,774	87,001,160	294,225	363,485,709	76.1
1888	316,593,914	96,588,431	1,252,251	411,930,094	79.8
1889	379,350,192	114,255,404	996,835	492,638,761	77.0
1890	367,204,045	94,164,382	834,726	460,533,701	76.7

The above data show how fast the home production increases, and how at the same time the foreign import thereof declines. The export of coal from Russia bears un-

til now an incidental character; thus, the consumption of coal in Russia is determined by the home production and foreign import.

The state of the production of coal in Russia may be seen from the following data.

YIELD OF COAL IN THE BASINS OF:	1890.	1889.	1888.	1887.	1885.	1881.
	T H O U S A N D S O F P O U D S.					
Donets	183,249	189,869	136,760	125,484	114,946	91,298
Poland	150,793	151,109	147,357	121,156	109,282	85,775
Near Moscow	14,268	18,697	16,865	17,589	21,308	23,426
Ural	15,224	16,040	12,757	9,972	10,875	10,031
Kouznetsk, government of Tomsk	1,052	895	1,010	808	795	487
Littoral region. Saghalin. . . .	893	650	600	556	550	318
Caucasus	605	667	511	216	213	218
Turkestan	301	423	426	366	417	—
Kiev-Elisavetgrad	693	853	215	559	555	584
Kirghiz steppe	127	175	92	73	1,634	1,051
Onega	1,8	1,1	—	—	—	70

From these data it may be seen that the greatest amount of coal is produced in the Donets and Polish regions, in which the production has been systematically rising during the last decade. The other regions mainly supply the local wants, therefore special attention should be paid to the first region, which is so rich in deposits of coal that it can supply Russia with fuel not only for many a century, but also can export great quantities of it, as the exploitation of coal deposits in that region, begun in the sixties, has greatly increased. In the Donets basin the area of the coal deposits attains 25,000 square versts. If it be admitted that each square verst contains 50,000,000 pouds of combustible coal, though in reality there is much more of it, it will be found that the above-mentioned region possesses 1,250,000,000 pouds coal, which form an exhaustless source for all the present and future demands of Russia, however great they may be. The favourable geographical position of this region guarantees still more all the home demands for this fuel, and it is to be hoped that the competition which has recently begun between foreign and Donets coals will soon terminate to the advantage of the latter.

The above mentioned deposits are also the principal points from which coal is transported by rail and water ways. It must, however, be observed that, owing to coal being so cheap, it is seldom transported long distances by railways; generally such factories as have great use of it, are concentrated near the coal mines, so that the fuel is brought to them in carts or by tramways. Until now very small quantities of coal are transported by water, although it is the cheapest method. Near the Donets mines flows the river of the same name, but it is not as yet adapted to the transport of coal. Of the 460,000,000 pouds of coal, consumed in 1890, 266,900,000 pouds were carried in the same year by rail, and 3,900,000 by the interior water ways;

and of the remaining 130,000,000 pouds, a part was consumed on the spot, a part transported in carts, and some transformed into coke. The distance which this fuel has been transported by railways is 82,900,000,000 poud-versts, which forms on the average 311 versts per poud of coal. The railroads which carried coal in 1890, and which can be divided into two groups, one consisting of such as transport more coal than they consume, and the second of such as consume more than they transport, are as follows:

R A I L W A Y S.	TRANSPORT- ED, IN MIL- LIONS OF POUDS.	RECEIVED, IN MILLIONS OF POUDS.
Warsaw-Vienna.	90.4	59.8
Donets.	73.7	11.6
Kozlov-Voronezh-Rostov	22.4	17.8
Ivangorod-Dombrovsk	17.5	7.8
Ekaterininsk	16.8	21.9
Kursk-Kharkov-Azov	13.4	20.3
Lodz	0.2	24.5
Moscow-Kursk	1.1	10.7
Kharkov-Nikolaev.	—	16.2
South-Western	8.8	11.1

Russian coal, as has been already mentioned, is not carried by rivers, as the total transport by the interior water ways amounted in 1890 to only 3,900,000 pouds, of which Samara alone received 1,500,000 pouds. If it be added thereto, that 15,800,000 pouds were transported by coasting vessels, of which 15,600,000 by the Black Sea, the principal points of departure being Marioupol, 6.3 million pouds; Taganrog, 2.3 million pouds; and Rostov 4.2 million pouds; the principal destinations, Odessa, 6.9, and Kerch, 2 million pouds, the total amount of coal transported by water in the limits of Russia, will be obtained. The seas are of special importance for the import of coal, as more than 90 per cent of it comes in that way; of these the principal are: the Baltic, 74.6 million pouds; Black Sea, 9.5; and White Sea, 0.3 million pouds. The principal ports to which coal is imported are: St. Petersburg, 57.3 million pouds; Riga, 9.3; Odessa, 8.6; Libau, 3.6; Reval, 3.0; and Sebastopol, 0.6 million pouds.

By summing up the information received in 1890 concerning the principal points of coal consumption, it will be found that St. Petersburg consumes 52 million pouds (receives 57.3, and transmits 5.3 million pouds); Warsaw consumes 29.8; Odessa, 16.4 millions, receives by railway 3 millions, from abroad 8.6, by coasting, 6.9, and exports by railway 0.6, and by coasting, 1.6 million pouds; Rostov-on-Don consumes 10.6 million pouds; receives by railroad 15 millions, exports by coasting, 4.2, and by railways, 0.2 million pouds; Moscow consumes 8.3 millions, receives by railways 8.5 and exports 0.2 million pouds.

In conclusion it must be observed that data given by railroads concerning the transport and consumption of coal include not only pit coal but also wood coal, peat

and coke, but the customhouse gives separate data concerning coke and pit coal. Thus, for example, the import of coke amounted in 1891 to 12,300,000 pouds, distributed in the following manner: Sosnovitsy, 5,800,000; Granitsa, 3,100,000; and St. Petersburg, 2,600,000 pouds.

Naphtha, naphta residues, and similar liquid combustible materials, appeared in the Russian trade some 20 or 30 years ago, and since then the demands for them have increased yearly. Owing to some technical conveniences in the using of this fuel, as also to its low price, it competes successfully not only with wood, but also with pit coal. Without stopping to examine the physico-chemical nature of this kind of fuel, only the statistics of its production and consumption will be discussed here. It consists of raw naphtha, or still oftener of what is called naphtha residues, that which remains after naphtha has been distilled for obtaining different lighting and greasing oils.

By the Russian method of distillation only 33 per cent of refined products is obtained from the crude material, so that 67 per cent are residues. Only the production of raw naphtha can be more or less precisely calculated, but there are no data showing the amount of naphtha residues. Taking, however, the above-mentioned relation between naphtha and its residues into consideration, the quantity of the latter can be approximately calculated. Hereto it must be added that about 5 per cent of the raw naphtha is used as fuel, on the local engines and in houses.

Y E A R S.	Q U A N T I T Y O F N A P H T H A P R O D U C E D.	U S E D O N T H E S P O T A S F U E L.	Q U A N T I T Y O F N A P H T H A D I S - T I L L E D.	R E S I D U E S O B T A I N E D.
	M i l l i o n s o f p o u d s.			
1881	41	2	38	25
1885	116	5	110	73
1886	120	9	114	76
1887	166	8	158	105
1888	194	10	184	123
1889	202	10	192	127
1890	242	12	231	154

Of this quantity of residues about 15 per cent is employed for the distillation of naphtha; but how much is used for other local demands, such as the heating of steam engines with naphtha and kerosene, as also mechanical and other factories, is unknown. Judging, however, by the fact that from the principal centre of the Russian naphtha industry, Baku, were shipped, in 1890, 96.9 million pouds of residues, and in 1892, 116.8 million pouds, it may be supposed that the local consumption of liquid fuel is very considerable. Nearly the total amount of naphtha and its residues, used in the Russian trade, is produced from the government of Baku, as all the other naphtha-producing localities give only 0.8 per cent of the total quantity. Naphtha residues are exported as follows: 1. abroad, either by the Transcaucasian Railroad as far as Batoum, or through the south Russian Black Sea ports; 2. to Persia, by the Caspian Sea, through Astrakhan, the Volga, and the Transcaspian region. These are the only ways by which

the combustible liquid of the Apsheron peninsula goes abroad, as until now naphtha and its residues are exported in small quantities, the total amount of the export not exceeding 2,500,000 pouds.

Of the 96.9 million pouds of naphtha and its residues shipped from Baku, in 1890, by the Caspian Sea, part was used as fuel for the Caspian fleet, part exported to Persia, and only 85.7 million pouds sent by coasting vessels, of which 83.1 millions went to Astrakhan. In the latter town, as well as in Tsaritsin, there are storehouses for this combustible; the Volga fleet, mechanical works, glass factories and others, get their supply of fuel here, and the remaining quantity of naphtha is sent, according to demands, up the Volga. Thus, in 1890 by that river were conveyed 44.3 million pouds, which were distributed between the principal harbours in the following manner: Nizhni-Novgorod, 13.7 million pouds; Tsaritsin, 11.7; St. Petersburg, 6.6; Saratov, 3.1; Kazan, 2.8; Yaroslav, 2.5; Samara, 2.1; Rostov-on-Don, 0.5; Kineshma, 0.4; Rybinsk, 0.3; Perm, 0.3; Kostroma, 0.2; and Moscow 0.04 million pouds, all which formed a total of 38.2 million pouds. On all these harbours part of the naphtha is consumed on the spot, part is carted to the neighbouring works and factories, and the principal mass is transported by rail to different towns.

In 1890, 34,500,000 pouds of residues were carried by different railroads in the following proportions: Griaze-Tsaritsin transported 6.6 million pouds; Kozlov-Saratov, 1.2; Moscow-Nizhni-Novgorod, 14.2; Moscow-Riazan, 1.1; Moscow-Yaroslav-Vologda, 2.5; Orenburg, 1.6; Sysran-Viasma, 0.3; Shouisk-Ivanovsk, 0.5. Hereto must be also added a part of the fuel, namely, 3.5 million pouds, sent from Baku by the Transcaucasian Railway, through Batoum-Poti to the northern ports of the Black Sea. It is to be understood that the most considerable points of export of naphtha and its residues, are those stations of the above-mentioned railroads, as have the nearest connection with the water ways. But, as they only serve as transmitting points, and have no independent importance, it is necessary, in order to have a clear idea of the distribution of liquid fuel throughout the Empire, to point out the railway stations where naphtha is principally consumed.

In that respect Moscow occupies the first place, consuming 11.2 million pouds, which forms one-third of the whole amount transported; next come Batoum, 2.3; Orekhovo, 2.1; Griaze, 1.4; Bogorodsk, 1.3; Novorossisk, 1.0; Kozlov, Riazan, Riga, and Muhlgraben, 0.8 each; Kouskovo *, 0.7; Karabanovo, 0.6; Tiflis and Ivanovo, by 0.5; and St. Petersburg, 0.3. If thereto be added the quantities transported by water, then St. Petersburg and Moscow are the two principal markets for the consumption of naphtha and its residues, the former using 6.9, and the latter, 11.5 million pouds. It is true that a part of this material is used for making gas, and for other technical wants, but still the greatest part of it serves as fuel.

Thus, having given a general idea of the production of different combustible materials, and their distribution throughout the Empire by rail and water ways, the separate industries consuming these materials may now be examined; such are: 1. works and factories; 2. the metallurgical industry; 3. railways; 4. steamers on the interior water ways, as corresponding informations exist.

* Kouskobo near Moscow and some other localities receive naphtha for the manufacturing of illuminating and greasing oils.

THE CONSUMPTION OF FUEL AT FACTORIES.

The statistic of works in Russia do not as yet stand on a firm foundation. If there are reasons to complain that the data showing the consumption of raw material, and the production of the factories, are not satisfactory, the figures as regards the quantity of fuel used are still more incomplete. The reason of this is that, in localities where fuel is cheap, its consumption is not registered, and such factories as do register it, have not been included in the data published by the Department of Trade and Manufactures. Therefore, the under-mentioned data must be considered as relative only, and of no great importance. They concern the following eight groups:

I. The manufactures from fibrous materials, including the spinning and weaving industries from cotton, flax, hemp, jute, wool, and silk; dyeing and printing of stuffs; production of rope and thread; the manufacture of tarpaulin, and other impermeable tissues.

II. The manufacture of foodstuffs, such as groats, flour, oils, molasses, malt, confectioneries, preserves, salt, sugar, cheese, spirits, artificial mineral waters, and the like.

III. Chemical productions: acids, lyes, and salts, colours, varnish, paraffin and cosmetics.

IV. Manufactures of tallow, wax, hides, furs, bone, glue, hair, bristles and others.

V. Manufactures of wood, the making of furniture, and wooden goods, horn-articles and dry distillation of wood.

VI. Manufacture of metals: cast-iron, and steel productions, the making of iron, and machine construction, production of wire and nails, articles from copper, bronze, silver, gold, and others.

VII. The manufacture of clay: brick, cement, pottery, earthenware and glass productions.

VIII. Paper, pasteboard, tapestry, and the like.

IX. This section contains all that has not been included in the preceding groups, as equipages, gutta-percha articles, mineral, illuminating, and greasing oils, gun powder, graphite, musical instruments, and the like.

From the below table it is seen that the manufacture of fibrous materials consumes more fuel than any other in the Empire; it uses 34 per cent of wood, 20 of pit coal, 72 of peat, and 34 per cent of liquid fuel. In order to give an idea of the relative consumption of one or another sort of fuel, it may be considered that 1 cubic sagene of wood = 100 pouds of pit coal = 225 pouds of peat = 60 pouds of naphtha residues. Of course these relations, dependent on the quality of the fuel and the manner of using it, are not always uniform, but are sufficiently exact for approximate comparisons. By transferring, according to this calculation, the consumption of coal, peat, and naphtha, to wood, it will be found that 1,178,000 cubic sagenes of wood are required for the manufacture of fibrous materials, and that in reality 44 per cent of wood, 27 per cent of coal, 13 per cent of naphtha, and 16 per cent of peat were used.

The following table shows the quantity of fuel consumed by each of the above-mentioned manufactures.

MANUFACTURES.	WOOD IN CUBIC SA- GENES *.	COAL IN POUDS **.	PEAT IN POUDS ***.	NAPHTHA RESIDUES IN POUDS.	THE TOTAL QUANTITY OF FUEL CONSUMED IN CUBIC SAGENES.
Of fibrous materials	525,260	31,810,000	33,297,000	11,763,000	1,178,000
» foodstuffs.	241,096	30,708,000	4,348,100	3,430,425	625,000
» chemical products.	53,116	6,275,140	338,000	763,100	130,000
» animal »	49,599	2,667,200	253,000	799,770	91,000
» wood »	53,365	426,270	51,000	46,200	59,000
» metal »	137,524	69,456,000	1,923,000	966,045	855,000
» clay, sand and the like (Ce- ramics)	349,884	13,970,830	4,848,000	753,900	621,000
» paper materials	98,974	5,544,432	655,000	237,000	161,000
Manufactures not mentioned in the preceding rubrics.	11,614	1,950,190	100,000	6,767,000	311,000
Total.	1,521,032	162,808,062	45,813,100	35,526,440	4,031,000

In the manufacture of foodstuffs the predominating fuel is coal, naphtha and peat being here of still less importance than even in the manufacture of fibrous materials. Pit coal has the same predominating importance in the chemical, and still more in the metal and wood manufactures, exceeding by 6 times the quantity of wood fuel consumed. In the manufactures belonging to the ninth group, the first place is occupied by liquid fuel, owing to the fact that this group includes the naphtha distilling industry, which alone consumed, in 1890, 16,507,547 pouds of naphtha residues.

Thus the works and factories of the Empire consumed in 1890, according to registered information such a quantity of different fuel as would equal 4,000,000 cubic sagenes of wood, of this quantity 29 per cent were used for the manufacture of fibrous materials; 21 per cent, for that of metals; 15 per cent, for the manufacture of foodstuffs; and 14 per cent, in the ceramic industry.

The consumption of coal equals 1,628,000 cubic sagenes, or about 40 per cent; of wood, 38 per cent; naphtha, 15 per cent, and peat, 5 per cent. Such a predomination of mineral fuel over vegetable fuel merits serious attention, as only a short time ago the contrary could be remarked.

* In the data, given by the Department of Trade and Manufactures fir wood cut into 10 to 12-inch billets is shown called *shvyrkov sagene*, but here, the *shvyrkov* sagene is transferred into cubic sagenes.

** Together with pit coal, wood coal is also included in this rubric.

*** In the information given by the above mentioned Department, peat is shown in four different measures, all of which are transferred into pouds here; 1 cubic sagene of peat = 250 pouds, a piece = 4 pounds, and a carload = 610 pouds.

In order to survey the geographical distribution of the consumption of different fuel, it is most convenient to divide European Russia into 14 regions, as adopted in the introduction.

R E G I O N S.	WOOD IN CUBIC SA- GENES.	COAL IN POUDS.	PEAT IN POUDS.	NAPHTHA IN POUDS.
I. Moscow central	639,000	8,811,000	34,148,000	14,573,000
II. Baltic-St. Petersburg . .	228,000	41,794,000	445,000	10,500
III. Finland.	—	—	—	—
IV. Northern	24,000	—	—	—
V. Eastern	182,000	4,823,000	1,296,000	1,735,000
VI. Siberian	33,000	2,000	—	—
VII. Central Asia.	2,300	50,000	—	—
VIII. Caucasus	16,000	1,093,000	25,000	17,440,000
IX. Southern	9,000	43,417,000	—	326,000
X. South-western	94,000	1,584,000	238,500	—
XI. Volga	91,000	50,533,000	5,100,000	—
XII. North-western.	50,000	323,000	350,000	—
XIII. Little Russia	22,000	6,294,000	35,000	—
XIV. Central Chernoziom . . .	132,000	3,926,000	4,273,000	1,438,000

From the above table it is seen that the greatest quantity of wood is consumed by the Moscow Central region, namely, 40 per cent; next comes the Baltic-St. Petersburg region, 14 per cent; the eastern, 12 per cent, et cetera. Notwithstanding the considerable development of the trade and manufacturing industries in the above regions, the predomination of vegetable fuel there can be explained, on the one hand, by the abundance of wood, and on the other, by the fact that the coal mines are very far from them. The abundance of the latter in the Vistula region, and the proximity of mechanical works and factories for the manufacture of fibrous materials, explain the large consumption of coal in that locality. Wood is comparatively dear there, naphtha does not exist at all, and the quantity of peat is very inconsiderable.

THE CONSUMPTION OF FUEL IN METALLURGICAL WORKS.

The different metallurgical branches use a considerable quantity of fuel, but it is impossible to define by the statistics of the industry in Russia the total amount consumed by all of these branches. Data exist only concerning the iron, naphtha and salt industries; but there is no exact information, as to the consumption of fuel in other metallurgical works, such as the gold, silver, lead, zinc, copper, coal and others, although there are reasons to suppose that here also considerable quantities of fuel are used. Trials have been made to calculate the total consumption of wood at all the metallurgical works of European Russia, and that only for 1890. Not

having more exact informations, these figures, as officially published, are given below.

W O R K S.	QUANTITY OF WOOD PREPARED IN CUBIC SAGENES.	QUANTITY OF WOOD USED FOR MAKING COAL, IN CUBIC SA- GENES.	QUANTITY OF COAL PROCURED.	
			HEAP COAL.	STOVE COAL.
			IN CROWN HAM- PERS *.	
Ural, Government	135,518	127,844	311,059	6,220
» private	54,637	60,454	93,856	99,842
» » in the district of Perm.	185,954	112,113	145,188	250,497
» » » » » Verkhotoursk.	141,990	133,234	234,361	12,444
» » » » » Eastern Eka- terinburg.	115,961	111,000	248,212	12,661
» » » » » Western Eka- terinburg.	188,011	145,278	298,387	5,629
» » » » » Ufa	235,617	167,425	232,519	81,634
Caucusus	548	548	1,350	—
Olonets.	6,991	4,192	7,765	10,981
Poland.	73,392	53,112	121,749	—
Beyond Moscow	133,442	84,837	145,924	27,020
Of the south-western district	25,522	11,120	13,853	—
Total of all the metallurgical works of Euro- pean Russia	1,291,520	1,011,194	1,948,223	507,028

More exact information exists concerning the three above mentioned manufactures, namely, the iron, naphtha distilling and salt-making industries. Data, showing the consumption of fuel at works preparing cast-iron, iron and steel, are seen from the following table.

CONSUMPTION OF FUEL.	Y E A R S.			
	1890.	1889.	1888.	1887
Wood, in cubic sagenes	816,331	746,841	924,852	924,266
Wood coal, in hampers	2,868,313	2,600,058	2,914,157	2,516,631
Anthracite in pouds	2,465,154	2,188,410	36,802,008	46,525,140
Pit coal » »	20,383,770	25,215,593		
Coke » »	39,238,463	19,322,559	1,488,009	2,882,334
Naphtha » »	1,625,367	—	155,000	120,000
Peat, in cubic sagenes.	15,175	16,583	17,914	21,500

* A crown hamper, called *korob*, contains 70 $\frac{1}{4}$ cubic feet, weighing about 28 pounds.

From the above table it is seen that the principal fuel in the Russian iron manufacture is wood though during recent years it is being visibly replaced by coal; naphtha, as well as peat, is of no importance here.

The following table shows the distribution of fuel in the iron works of the different metallurgical districts.

FUEL S.	D I S T R I C T S						
	Ural.	Moscow.	Poland.	Southern and south-western Russia.	Northern.	Siberia.	Finland.
Wood cubic sageses	577,078	147,541	35,810	2,350	20,397	11,407	21,748
Charcoal, hampers.	2,152,757	336,644	176,786	17,658	21,831	44,927	118,710
Anthracite pouds	35,154	—	—	2,430,000	—	—	—
Pit coal »	2,045,410	1,078,388	1,997,728	—	14,465,806	263,258	533,180
Coke »	23,576	56,207	7,146,353	30,901,703	1,104,509	5,565	—
Naphtha »	—	1,625,367	—	—	—	—	—
Peat cubic sageses.	10,175	5,000	—	—	—	—	—

Thus, in the Ural, Moscow and Finland districts, the predominating fuel is the vegetable; in the southern and northern, mineral fuel; and in the Polish and Siberian districts the consumption of vegetable and mineral fuel is about equal.

Salt is principally distilled in the Perm, Kharkov, Ekaterinoslav and Warsaw governments; and in the whole Empire, in 1890, this industry consumed 108,559 cubic sageses of wood, and 4,925,425 pouds of coal. The government of Perm alone uses of this quantity, about 80 per cent vegetable, and 50 per cent mineral fuel. The governments of Kharkov, Ekaterinoslav and Warsaw use for distilling salt only pit coal; and those of Vologda and Archangel, and the whole of Siberia, only wood.

The naphtha-distilling industry in the government of Baku, where there is no coal, and round about the numerous naphtha sources no vegetation, consumes great quantities of naphtha fuel. Thus, in 1890 the production of naphtha consumed at least 12,000,000 pouds of naphtha fuel, principally for heating the local steam boilers.

THE CONSUMPTION OF FUEL ON RAILROADS.

The Russian railways, dependent on the locality through which they run, consume different kinds of fuel, both of home production, and of imported. The following data show the quantity of different sorts of fuel consumed by Russian railroads. The Military Transcaspian, and the Finland railways are not included in the following table, as there are no exact data concerning them.

DIFFERENT SORTS OF FUEL.	1890.	1889.	1888.
Wood of different sorts, in cubic sagenes. . .	602,036	655,518	651,021
Wood coal in pouds	393,463	406,716	337,707
Donets anthracite in pouds.	5,121,151	5,992,555	6,940,523
Pit coal, Russian and foreign, in pouds . . .	75,437,639	78,274,383	78,517,321
Briquettes in pouds	551,361	780,514	962,033
Coke » » 	358,613	332,180	289,144
Peat » » 	3,131,958	3,107,162	2,502,523
Naphtha » » 	17,654,607	12,994,112	8,707,559
Total quantity of fuel, expressed in cubic sagenes of wood.	1,584,864	1,586,714	1,560,406

This last calculation is based on investigations made on railroads in 1890, concerning the substitution for one cubic sagene of wood, as to its heating power, of different sorts of fuel; thus, a cubic sagene of wood can be replaced by 117 pouds of wood coal, by 99 pouds of Donets anthracite, 98 to 100 pouds of Kouban and English coal, 108 pouds of smoked Donets coal, 117 pouds of Polish pit coal, 196 pouds of pit coal from the Moscow deposits, 101 pouds of coke, 101 pouds of briquettes, 227 pouds of peat, and 71 pouds of naphtha residues. These figures differ a little from the above, especially as regards naphtha.

In the total the consumption of fuel has increased in 1883 to 1,361,000 cubic sagenes, and in 1890, to 1,585,000; this increase concerns principally naphtha, as to the others a decrease rather is to be noticed. Thus, the demands for anthracite decreased from 9,231,655 pouds in 1883 to 5,121,151 pouds in 1890, that is, to 45 per cent.; that of pit coal grew from 61 million pouds in 1883, to 75 millions in 1890, the greatest increase being observed in the consumption of smoked Donets coal, from 20 to 39.8 millions, of the Ural from 1.7 to 5.7 millions, and of the Polish from 11.9 to 17.6 million pouds. The consumption of the other sorts of coal has decreased; of the Moscow deposits, from 9.8 million pouds to 5.4 millions, and of English, from 9.6 to 6.7 million pouds. A decrease is also observed in the using of briquettes, from 4 million pouds in 1883, to 0.6 millions in 1890; and a small decrease in that of coke. The demands for peat have visibly augmented, but this fuel has no serious importance for Russian railways. The consumption by railroads of naphtha fuel has increased exceedingly, from 115,605 pouds in 1881, to 17,654,607 pouds in 1890.

The predominating fuel of the Russian railroads is, however, pit coal, including not only pit coal from different localities, but also anthracite, coke, and briquettes. By expressing the above-mentioned quantities of coal in wood, according to the practically defined coefficients, it will be found that the total quantity of coal consumed by the Russian railways equalled 723,184 cubic sagenes of wood; of vegetable fuel, including charcoal and peat, 612,543 cubic sagenes were consumed; besides, the amount of naphtha in use was equal to 249,137 cubic sagenes of wood. Thus, by

expressing these figures in per cents, it will be found that the consumption of coal amounted to 45.8 per cent; of wood, to 38.6; and of naphtha, to 15.6 per cent.

Passing over to the distribution of the different sorts of fuel in the separate regions, it will be found that wood is consumed in greater or less quantities on all railroads without exception; owing to this, the above fuel is distributed more equally than any other. The greatest quantity of wood is consumed by the Nicholas Railway, namely 13 per cent of the total; next come the South-Western, $12\frac{1}{2}$ per cent; St. Petersburg-Warsaw, 9.6 per cent; Moscow-Brest, 7.4 per cent; and Orel-Vitebsk, 7 per cent.

The Donets smoked coal is consumed in a certain region; thus, the greatest demands for it are on the Kursk-Kharkov Railroad, namely 17.7 per cent; then come the south-western, 11.8 per cent; Moscow-Koursk, 11; the Ekaterininsk, Vladikavkaz and Kharkov-Nicholas railways, 10 per cent each; Donets, 9 per cent, and so on. A smaller quantity of this coal is used on the Lozovo-Sebastopol, Moscow-Brest, Kozlovo-Voronezh-Rostov railroads, and others. Coal of the Polish basin is principally consumed by the Warsaw-Vienna Railway, 36 per cent; the Vistula Railway, 23 per cent; Ivangorod-Dombrovsk, 13 per cent; Warsaw-Terespolsk, 10 per cent, and the like. The imported English coal is principally used on the Baltic Railway, which consumes 42 per cent of the total amount used by the whole network of roads; next, the Riga-Dunaburg, 14 per cent; Lozovo-Sebastopol, 12 per cent; Libau-Romny and Pskov-Riga, 10 per cent, and so on. The Donets anthracite is almost exclusively used by the Kozlovo-Voronezh-Rostov Railway, 76 per cent; and Vladikavkaz, 74 per cent. Naphtha residues are principally consumed, of course, by the Transcaucasian Railway, being the nearest to the naphtha deposits, namely 35 per cent; as also by the railroads in proximity to the cheap Volga-Caspian waterway, such as, the Griaze-Tsaritsin, 17 per cent; Orel-Griaze, 7 per cent; Riazan-Kozlov, and Moscow-Riazan, 6.8 per cent each; Syzran-Viazma and Moscow-Kursk, 6 per cent each; Tambov-Saratov, 5 per cent; also, small quantities of liquid fuel are used by the Baskoun chaks, Samara-Zlatoust, Orenburg, Moscow-Yaroslav-Vologda, Moscow-Brest, and other railroads.

The using of briquettes as a fuel is of no great importance; it is chiefly employed by the South-Western Railway, 58 per cent; the Fastovsk, 34 per cent, and the Moscow-Brest, 15 per cent. Coke, having a special signification, is used in small quantities by all the railroads. Finally, peat is only spread in the region of its production, and cannot bear distant transportation. It is only used on the Moscow-Nizhni-Novgorod, 78 per cent; and the Moscow-Riazan railways, 14 per cent.

CONSUMPTION OF FUEL ON RIVER STEAMERS.

The river steamboat navigation has considerably developed during recent years in Russia. In 1886 there were only 1,507 steamers on the rivers of European Russia, and in 1890 their number increased to 1,824. Together with the increase of the number of steamers, the quantity of fuel consumed by them increased accordingly; thus, in 1886 the amount of different fuels consumed equalled 655,000 cubic sagues of wood, and in 1890 it amounted to 896,000 cubic sagues. The following table shows the quantity and sort of fuel used on the different steamboats in 1890; at the end of the table are placed the totals for 1886.

BASINS.	IN 1890.	Total number of steamers.	THE SORT AND QUANTITY OF FUEL USED BY THE STEAMERS.					
			Wood.		Pit coal.		Naphtha residues.	
			Number of steamers using wood.	Total quantity of wood used by steamers during one navigation, in cubic sagues.	Number of steamers using coal.	Total quantity of coal used by steamers during one navigation, in pounds.	Number of steamers using naphtha residues.	Total quantity of naphtha residues used by steamers during one navigation, in pounds.
Volga.	Passenger steamers.	84	35	9,955	6	14,808	43	2,197,991
	Goods and passenger steamers.	109	34	19,802	—	—	75	5,308,669
	Goods steamers.	14	1	116	4	390,000	9	487,720
	Tug passenger	67	27	11,047	2	8,400	38	1,556,212
	Tug steamers.	646	174	99,895	2	22,000	470	25,016,500
	Chain cable steamers	24	14	3,582	—	—	10	110,000
	Service	71	15	1,267	16	50,000	40	361,450
	Total.	1,015	300	145,664	30	485,700	685	35,038,542
Neva, with its lakes.	Passenger	12	2	1,380	10	149,000	—	—
	Goods-passenger	20	5	2,173	15	1,223,200	—	—
	Goods	1	—	—	1	13,400	—	—
	Tug passenger	7	5	1,463	2	26,000	—	—
	Tugs.	164	84	24,689	80	2,133,195	—	—
	Chain cable steamers	2	2	400	—	—	—	—
	Service steamers	13	2	346	11	90,200	—	—
	Total.	219	100	30,451	119	2,634,995	—	—
North Dvina.	Total.	90	60	20,745	30	410,620	—	—
Dnieper and the south Bug	Total.	234	80	21,481	152	5,519,382	2	62,500
Western Dvina	Total.	59	8	1,244	51	1,219,025	—	—
Niemen	Total.	11	7	1,561	11	21,700	—	—
Vistula	Total.	24	—	—	24	403,500	—	—
Don	Total.	139	—	—	138	5,123,464	1	12,000
Dniester	Total.	11	—	—	11	411,377	—	—
Narova	Total.	18	15	1,673	3	24,500	—	—
Onega	Total.	4	3	650	1	10,000	—	—

BASINS.	IN 1890.	Total number of steamers.	THE SORT AND QUANTITY OF FUEL USED BY STEAMERS.					
			Wood		Pit coal.		Naphtha residues	
			Number of steamers using wood.	Total quantity of wood used by steamers during one navigation, in cubic sagues.	Number of steamers using coal.	Total quantity of coal used by steamers during one navigation, in pouds.	Number of steamers using naphtha residues	Total quantity of naphtha residues used by steamers during one navigation, in pouds.
By all the interior water ways of European Russia in 1890 . .	Passenger steamers . . .	248	94	20,956	111	3,339,429	43	2,197,991
	Goods-passenger steamers	179	49	25,526	55	2,746,468	75	5,308,669
	Goods steamers	80	1	116	68	2,787,891	11	550,220
	Tug passenger steamers .	162	90	35,486	31	948,240	38	1,556,212
	Tugs steamers	989	299	135,351	219	6,364,515	471	25,028,500
	Chain cable steamers . .	26	16	3,982	—	—	10	110,000
	Service steamers	140	24	2,052	76	1,077,720	40	361,450
	Total . . .	1,824	573	223,469	563	17,264,263	688	35,113,042
In 1886 . .	Passenger steamers . . .	167	77	24,359	84	1,397,042	6	235,200
	Goods-passenger steamers	158	76	45,321	42	2,008,943	40	3,441,220
	Goods steamers	67	1	116	60	1,848,660	6	247,720
	Tug passenger steamers .	153	97	35,486	43	703,500	13	739,875
	Tugs	811	380	178,896	187	3,839,010	244	11,958,435
	Chain cable steamers . .	26	26	10,765	—	—	—	—
	Service steamers	125	35	3,945	59	505,145	31	449,000
	Total . . .	1,507	92	298,888	475	11,302,300	340	17,071,455

Wood fuel is only predominant in the basins of the Volga, North Dvina, Niemen, Narova and Onega. In the basins of the Vistula, Don and Dniester, steamers do not use wood fuel at all, but coal exclusively. The latter predominates also in the basins of the Neva, Dnieper, and Western Dvina; the Volga basin uses coal in very small quantities. In the above table the great predominance of the naphtha fuel may be observed. And in reality, by using the coefficients mentioned in the railway practice, it will be seen that the consumption of coal by steamers equals 172,643 cubic sagues of wood, and that of naphtha, 500,000 cubic sagues; and consequently, as the total quantity of fuel consumed amounts to 896,000 cubic sagues, liquid fuel forms 55.5 per cent; wood, 24.5; and pit coal, 20 per cent.

The Volga basin has the greatest trade importance; it uses 72 per cent of the total amount of fuel, and is nearly the only consumer of naphtha and its residues. By comparing the data of 1886 and of 1890, the following results will be obtained: the number of steamers consuming wood decreases from 692 to 573, and the quantity of wood, from 299,000 to 223,000 cubic sagues; the number of steam-

ers using coal increases from 475 to 563, that is, 16 per cent, and the consumption of coal augments from 11,302,000 to 17,264,000 pouds, that is, 52 per cent.; the number of steamers using naphtha doubles, from 340 to 688, and the quantity of fuel increases from 17,071,000 to 35,112,000 pouds.

It is very difficult to calculate the amount of fuel used by sea steamers, as the greatest part of the vessels going abroad use foreign coal. The consumption of coal in coasting navigations is never registered, and therefore data concerning this subject are very incomplete.

There is no doubt that the private, as well as the Government fleet on the Caspian Sea use no other fuel than naphtha residues, but the quantity consumed is quite unknown. Some idea of this amount, however, may be derived from the above mentioned data concerning the production of naphtha and the transport of its residues. Here follows some supplementary information.

In 1890, 57 steamers laden with naphtha navigated on the Caspian Sea, their total capacity being 1.6 million pouds; on the total they made 1,725 passages, transporting 69 million pouds, and consuming 2,873,000 pouds of naphtha residues as fuel. In the same year there were 284 sailing vessels; the steam and sailing vessels taken together made 3,505 navigations, and transported 112,000,000 pouds of naphtha residues. The Caucasus and Mercury Co., which has a large number of steamers on the Caspian Sea for conveying passengers between its ports, has consumed for the heating of these steamers 1,373,014 pouds of naphtha residues and 1,838 cubic sages of wood. But, besides the naphtha motor steamers and those of the above-mentioned company, there are on the Caspian many others, (goods, passenger and war steamers), heated with naphtha, and concerning which there are no data.

Thus, on the general total, there is much, though incomplete information concerning the consumption of fuel by different administrations, and by summing up all these data the following table comes out.

LOCALITIES OF CONSUMPTION OF FUEL IN 1890.	C O N S U M P T I O N O F F U E L .				
	Wood in cubic sa- genes.	Coal in pouds.	Peat in pouds.	Naphtha residues in pouds.	Total quantity of fuel ex- pressed in cubic sa- genes of wood.
Factories and works, not metal- lurgical.	1,521,032	162,808,062	45,813,100	35,526,440	3,941,032
Metallurgical works: iron, salt, and naphtha	924,898	67,012,812	3,793,750	13,405,000	1,833,018
Railroads, besides the Trans- caspian and Finland	604,536 *	81,468,764	2,131,958	17,654,607	1,685,224
River steamers	223,469	17,264,263	—	35,113,042	981,142
Total.	3,273,927	327,553,901	52,738,808	101,699,089	8,440,386

* Together with charcoal.

Comparing these data with the before-mentioned on the production and consumption of coal, peat and naphtha, it will be found that, of the 460 million pouds of coal consumed in Russia in 1890, 328 millions, or 17 per cent, were used as fuel by factories, metallurgical works, railroads and river steamers, and the remaining quantity served for the heating of houses, sea-going steamers, and different administrations not included in the four above-mentioned rubrics. Peat was nearly all consumed by factories and railways, so that scarcely 10 per cent remained for the heating of house and other stoves.

The total consumption of naphtha residues will be nearly complete if thereto be added the total amount of this fuel used by the vessels of the Caspian fleet. Without going far wrong it may be admitted that these vessels consumed 12,000,000 pouds; consequently the total amount of naphtha fuel used in Russia in 1890 would be 114,000,000 pouds.



CHAPTER XXVII.

Wages and working hours in factories.

THE annexed table contains data showing the wages paid to workmen in the 74 different manufactures, the most important in Russia. From this table it may be seen that the average annual earnings of a workman in Russia amount to 187.60 roubles, counting a year of 288 days, and a day of 12 hours. Besides, the greatest annual earnings are on the average 606 and the smallest, 88.50 roubles.

The average wages of workmen in the separate regions are very different. Thus, in the central region, including the Moscow, Vladimir, and their neighbouring governments, they amount to 167 roubles; in the Petrokovsk government, to 188; and in that of St. Petersburg, to 232 roubles a year. These earnings are still more unequal for the several manufactures existing in the same region, as may be seen from the following table.

MANUFACTURES.	R E G I O N S.		
	Central region.	Petrokovsk government.	St.Petersburg government.
	R O U B L E S.		
Cotton manufacture	166	187	205
Woollen »	160	188	216
Flax »	143	138	148
Mechanic and machine.	250	243	362
Total average.	179	189	232

Over all the Empire, as well as in the separate manufacturing regions, the best wages are paid to workmen in steel and in machine factories, attaining on the

average 525 roubles a year. The smallest wages are in cotton spinning, wool weaving, flax weaving, dyeing, printing, and other like factories, where they range from 116 to 200 roubles yearly.

The labour of women and children is valued much lower than that of men. Generally, on the average, a woman gets about half, and a child one-third of the wages of a man; but sometimes the earnings of women and children differ considerably, dependent on the locality and on the kind of work they are employed in. In the tobacco manufactories, for example, a woman earns much more than one-half of what a man gets, namely, two-thirds; and children, not 33 per cent of man's wages, but 50 or even 60 per cent.

In order to have a clear idea of the dimensions of the workmen's wages, included in the table below, it is necessary to call attention to some peculiarities in the economical position of the Russian workman.

In Russia, which is principally an agricultural country, the great and small manufactories take their workmen from among the rural population. For the greater part workmen in Russian factories are at the same time landowners, who are not factory workmen by profession; the wages they earn in factories are not their only means of existence, but are only accessory to what they get by their agricultural labours. The workman loves his land, and does not like to leave it permanently for the factory; he has, therefore, continual intercourse with his village, and goes there yearly to see his relatives and neighbours, and still more to cultivate his own little farm. Therefore, the life of the Russian workman is quite different from that of the workman abroad. Thus, having his own land he is more independent in signing a contract with his master, and can demand higher wages than if he had no land and no home. It is true, there are cases when he does not profit by his independent economic position, but that happens seldom, and depends on the greater or smaller welfare of the peasant. Nevertheless, in making a contract with the manufacturer, he always has in view that, in case of failure, he can always return to his village, where he will get board and lodging. The foregoing explains why, in the manufacturing localities of central Russia, the wages change regularly twice a year; in spring and in summer they are 10 to 20 per cent higher than in autumn and winter. This occurs, as said above, because in spring many workmen return to their villages for field labour, and therefore in factories hands become scarce. The term of service of the Russian workman also depends upon the same circumstance. In the Moscow, Vladimir, and other governments of Central Russia, the workmen are generally hired from the 1st of October, when all field works are ended, until Easter, when such labours commence, or from Easter until the first of October.

Being an agriculturist by nature, and considering farm work to be the principal kind of labour, the Russian workman seldom tries to perfect himself in any other industry, and seldom chooses other occupations. This fact, of course, has a bad influence on his earnings; but on the other hand, in case of need, he finds a place more easily in some factory, than if he only knew some special industry, so much the more so that, having great natural capacity, he easily adapts himself to the technic of one or another industry. He therefore frequently, dependent on circumstances, works first at one factory, then at another, even if the two have nothing in common; thus, for example, he first serves in a cotton mill, and then he goes to

a glass factory. Owing to this fact, a contemporary French investigator of trade in Russia called the Russian workman *un ouvrier temporaire*, (temporary workman), *un nomade industriel*, (an industrial nomad). Exceptions are formed first of all by such workmen, who together with their parents begin from childhood to work in factories, and passing from simple to more complicated work obtain, when of age, not only knowledge but also dexterity, and thus become skilled in their respective trades. Next come such workmen as, when children, are sent from villages to towns to learn a trade; or such who, besides agriculture, practise different household industries, as for example, weavers, matting makers, locksmiths, and workers in china. Finally, workmen in such industries, the special knowledge of which gives a man the possibility to open with very little means his own small workshop, are workers in the wood and metal industries. All such men are specialists, and shun work in such factories as do not correspond to their speciality, finding it unprofitable or undesirable. These workmen generally serve, in small and large factories, under foremen. Moreover, a great number of workmen consists of the town inhabitants of both sexes, who have no land of their own, and very often no home.

Thus, in speaking of the earnings of a Russian factory man, it is also necessary to mention those profits which he gains as an agriculturist.

Again, the Russian workman spends very little of the money he earns, for food, lodging, and dress, as compared with those of other countries. Coming from the village he is very modest in his demands. His food is very simple, although abundant, and answers his tastes. It consists of *shi*, (cabbage soup), and meat, and some gruel with linseed oil, for dinner and supper; and for luncheon he drinks tea with black (rye) bread. On fast days he eats fish and vegetables instead of meat; his principal and favourite beverage is *kvas*. This food costs the workman still less, as in many factories sugar and tea are furnished to them by their masters. As the factory owners get these articles in large quantities, they buy them very cheap and of fair quality.

In Moscow, for example, the board of a workman comes to 4.50 or 5 roubles a month, or 54 to 60 roubles a year. But for the most part, both in town and village factories, the workmen board at their own expense. In order to reduce the cost they form associations, or clubs, called *artels*, and board together. An *artel* is generally formed either of workmen from the same village, or of the same factory section; they choose a chief from among themselves, who has to arrange all the affairs of the club; besides, they have several members authorized to control the chief, called the *starosta*. This latter buys provision, engages a cook, keeps the accounts, and calculates what each member of the *artel* has to pay. The accounts are then presented to the Administration of the factory, who pays them out of the earnings of the workmen. The Administration furnishes the *artel* with a kitchen, fuel, water and an eating room free, costing the factory about 2 kopecks per workman. Owing to such organizations the workmen receive cheap and good food. Of course, the boarding expenses are not uniform, and depend largely upon what the workmen, forming an *artel*, earn. There are workmen that earn 60 roubles a month, and which allow themselves more dainty food, but even then their board does not come dearer than seven or eight roubles a month each.

In many factories there are provisions stores kept by societies formed of the work-

men themselves. In such shops the workmen not only get all provisions at the market price, but even have a dividend of 3 to 6 per cent. Unfortunately there are very few such shops, kept by the workmen themselves; but instead, in all large factories which are out of town, there are shops, which by the quantity and variety of their goods, are no worse than groceries in the capitals. Here every workman has the right to take on credit, on account of his earnings, all that he wants, up to a certain limit; the price of the goods is the same as in the markets, and sometimes even lower. The workman is not bound to buy every thing he needs in the shops annexed to the factories; he can, if he likes, get things in other shops, but he avoids doing so; and the best proof of that is, that as soon as an *artel* shop is opened in connection with a factory, all the other shops in the neighbourhood begin to close little by little, as all their customers, principally workmen in factories, fall off.

Moreover, with the permission of the administration, weekly bazaars are organized in the factories. To such bazaars the local peasants bring flour, potatoes, cabbage, and other produce, so that the workmen can get cheap and good foodstuffs for a long time.

As to lodging, the Russian workman is also generally well provided. In nearly all large factories there are buildings specially constructed for lodging the workmen. Here they get lodging with fuel and lighting, sometimes free, or at a very low price, depending on the type of the building, the dimensions of the lodging, and the number of rooms. Russian factories have three types of building for lodging workmen. The first has the character of barracks. In enormous buildings, many stories high, large, light, and well ventilated halls are constructed, each containing either hammocks, or bedsteads with mattresses and pillows filled with straw. Married men, bachelors, girls and widows sleep in separate halls. There is a general kitchen, and a dining room in the building. The second type consists of buildings with lodgings. Here each story is generally divided by a corridor, on both sides of which are small rooms for families of 3 to 5 members. There are no dining rooms in such buildings, as the workmen eat in their own rooms; in each story there is a kitchen, and in it an enormous stove, which extends through all the stories, and has many cooking stoves. In the kitchen, or in a separate room, a kettle with boiling water is fixed for tea, or other needs of the workmen. The bedsteads, bedding and all the furniture, the workmen must furnish themselves, and they must light their own rooms. The factory administration only heats the house, and lights the staircase, corridors, and kitchens.

Finally, the third type of habitation the most in favour with workmen, but unfortunately very little developed in Russia, consists of separate stone or wooden small houses, containing from two to four lodgings each, and having separate staircases. Each house has a small yard, necessary out buildings, a garden, and a kitchen garden. As has been already mentioned the prices of lodgings vary greatly. Those in the buildings of the first type are much cheaper, than in the two others. But, in general, a lodging, together with the heating of it, costs a workman from 0.50 to 3 roubles a month, or from 6 to 36 roubles a year.

The Russian workman prizes above every thing a lodging provided by his master. Such lodgings are not only cheaper, but their price does not fluctuate, as is the case with private lodgings; furthermore, the workman has not to buy wood if

his lodging is furnished him, and that fact is of great value to him, owing to the winters being so long and cold in Russia. It happens very often that just at the time when wages fall, owing to the excess of the number of workmen over the demand, the prices of private lodgings are raised. Again, private lodgings are for the most part far from being in a good sanitary condition. Thus, of two factories, one of which has a building with lodgings for workmen and the other has none, the workmen generally prefer to serve in the former. This circumstance is well known by the Russian manufacturers, and therefore they all try to have ready lodgings for their employees, as otherwise they would sometimes suffer from the inability to secure good workmen.

Moreover, every large factory, situated out of town, has a hospital, that being ordered by the law, a bath, a school, a library with a reading-room; and some very well organized factories have, besides, almshouses for old workmen; and for babies, infant schools, and other charitable institutions. The workmen have the use of all this gratis, an important circumstance which must be taken into consideration in examining the question of wages.

In Russia, as in other countries, the workman is paid either by piece, as defined in the contract, the time for the fulfillment of that work being fixed by the workman, conformably to the regulations of the factory; or he is paid for time-work according to his ability; but the former is most general method of payment, the so-called *sdelnaia plata*, that is, payment by the piece. In a few manufactures, as for example machine construction, wages are paid to a whole *artel*, or workman's association, after a certain amount of work is completed. Formerly, the workmen always received daily or monthly wages, but now that method is only practised where the *sdelnaia plata* cannot be adapted.

In examining the amount of wages paid to workmen in Russia, it is necessary to see not only if they answer all the requirements of the workmen, but also if they really receive the wages agreed upon; to see if their earnings are not reduced in some way by the masters, unbeknown to the workmen. It is true, there was a time when the factory workman did not receive the full pay due to him for his labour, owing to different misusages on the part of his master. Thus, for example, the money was paid at indefinite periods; often the workmen waited some months for their wages, and during that time in order to exist had to borrow money, sometimes at large percentage, or else take on credit the things they most had need of, thus falling into debt. The arbitrary method of fining the workmen for laziness, breach of order, inexactitude in their work, and in fixing the amount of that fine, attained owing to the fact that there was no law to restrain it such extreme limits that the workman often received but one-third of his contract money. Such useful institutions as shops for workmen were only means, in the hands of some masters, of getting money from the workmen. The dismissing of workmen without any cause occurred very often. There were cases where the manufacturer lowered the wages of his workmen before the term was up, by decreasing the number of working days or hours, and paying accordingly.

All such arbitrary methods and misusages were stopped by a special law, published in 1886, touching «the mutual relation between the manufacturers and their workmen, and the inspection of different works and manufactories.» This law,

formed by a special commission in which the manufacturers took an active participation, is justly called by some foreign investigators of the Russian factories «a real humane reform which shows the solicitude of the Russian Imperial Government towards the working classes.» In it are precisely and clearly defined the mutual, profitable relations between the masters and their workmen; furthermore, special administrations for the inspection of factories, and for controlling the fulfillment of the contracts between the employer and his men, are organized. Thus, according to the 97th clause of this law, the manufacturers must have written contracts with their workmen; such a contract must be in the form of an account book, according to a sample confirmed by the Local Inspection. This book, which must be kept exclusively by the workman, contains: the term of the hire; the amount of wages; when and how they are to be paid; how much the workman has to pay for the lodging he has in the factory; all the fines imposed on the workman and the causes thereof; all other conditions which the parties will find necessary to inscribe in the book; finally, this book contains extracts of the law, and also regulations concerning the rights, duties, and responsibilities of the workman. These regulations, according to the law, must be composed by the administration of the factory, and sanctioned by the local Inspection; they must contain, according to the 142nd clause of the Statute, amongst other things, a separate description, for grown up workmen and for children, of the hours when the work is to commence, and at what o'clock to finish; how often and how long the workmen have a right to interrupt the work for resting, lunching and dining; at what o'clock they finish working on Saturdays and the evenings of holidays; what holidays they do not work at all, and the like. Furthermore, the manufacturer is bound to present to the Inspection for sanction a detailed valuation of the workmen's labour; such lists must be hung up in the workshops. Besides, it is strictly forbidden, according to clause 101 of the Statute, before the term of the workman is up, or without a fortnight's notice, if he is hired for no definite term, to lessen his earnings either by publishing a new list of wages, or by decreasing the number of working days or hours, or by any other means. It is also strictly forbidden, clause 104, under the penalty of a severe punishment, to pay the workmen, instead of money, in coupons, bread, wares, or other like values. This clause existed also in the former statute, but in the law of June 3, 1886, it is confirmed in greater detail, the punishment for the breaking of this law being made still more severe.

Clause 102 of the Statute defines the time when the money is to be paid to the workmen, dependent on the circumstance, whether they are hired for a certain or an uncertain period. In the first case, the money must be paid at any rate once a month; and in the second, not less than twice a month. The statute also enumerates all the reasons for which both parties can break the contract made between them, before the term is up; also cases, when the factory owner can dismiss a workman; in the latter instance the workman has always the right to complain to the magistrate, and if his complaint is considered just, the manufacturer has to pay him all his losses. According to the law of June 3, 1886, the manufacturer has the right to impose fines on his workmen; but in the first place, such penalties must have a true disciplinary character, and not serve as indemnification for the damages done by the workman; in the latter case the manufacturer has a right to complain to the magistrate; secondly, the law defines the circumstances under which the owner has the

right to impose a fine on the workman, as also the dimensions of such a fine; and thirdly, all these fines are transformed into a special capital, which is used, with the sanction of the factory Inspector, exclusively for supplying the needs of the workmen themselves. This humane measure, which deprives the manufacturers of the temptation to impose fines on workmen for their own profit, was proposed by the manufacturers themselves, who took part in the making of the law of June 3, 1886.

Shops for selling to workmen the objects of first necessity can be annexed to factories only with the sanction of the factory Inspection, which is obliged to see that the goods are sold to the workmen at the market price, and that they are of good quality. Therefore, the factory Administration is bound to present, from time to time, to the Inspection the price lists of the wares on sale; such a list, confirmed by the Inspection, must be exhibited in the shop for the benefit of workmen.

For the breach of all these regulations, as well as of others established by the law of June 3, 1886, special penalties are imposed. Thus, for example, if the manufacturer lowers the wages of the workmen in any way whatever before the term is up, or without at least a fortnight's warning, or if he pays them, instead of money, in coupons, wares, bread, or other articles, he is fined for the first and second offences, from 100 to 300 roubles; the third time, or even the first and second if only the circumstance has caused an agitation among the workmen, accompanied by disorders, especially if for putting an end to the latter extreme measures have to be taken, the manufacturer is arrested for three months and sometimes even deprived of the right of running a factory.

As has been already mentioned the duty of seeing that the law of June 3, 1886, is fulfilled was imposed by the same law on the factory Inspection. This latter was established in 1882, and annexed to the Ministry of Finance; its aim is to see that the law concerning young workmen is fulfilled. Later on, the number of persons forming this Inspection was increased. Besides, in each of the governments where this law was introduced, special administrations, bearing the character of a Court of Justice, and called Factory Councils, were established. The latter, the personal composition of which fully guarantees good judgment and impartiality in deciding different affairs*, consider the protocols made by the members of the Inspection concerning the breach of regulations in factories, and impose fines on the culprits in dimensions as fixed by law; these fines, not exceeding 100 roubles, cannot be complained against to the magistrates. For such deeds as merit the forfeiture of liberty and of certain rights, the culprits are judged by the Court of Justice. Furthermore, the Councils have a right to establish regulations concerning measures to be taken for guarding the life, health, and morals of the workmen, as also concerning medical aid. Similar regulations have the same force as a law, in factories and works of a given region.

* Each Factory Council consists of the chief of the government, who is the President, and of the following members: the local factory inspector, the procurator of the district Court of Justice, the chief of gendarmes, and two representatives from the factory. Besides, in the sessions, can take part the medical inspector of the government, the government engineer, architect and mechanic, as also other persons from whom useful information and explanations concerning the matter under examination may be derived.

The principal executor of the law of June 3, 1886, as well as of other regulations, concerning factories and works, is the Factory Inspection, with a principal Inspector at its head.

Besides the duty of carrying out all regulations concerning children, and minor workmen of both sexes and working women, the Inspection is bound: to see that the manufacturers and workmen observe all the rules concerning their duties and mutual relations; to introduce measures and rules established by the Councils, and to see that they are observed; to examine and confirm the table expenses, the list of fines, the rules to be observed by the workmen for introducing order in the factories, the valuation of labour; and principally to take measures for preventing disputes and misunderstandings between the manufacturers and their workmen, by examining on the spot such misunderstandings, and bringing the parties to an amicable agreement. The principal Inspector must direct and assimilate the activity of the members of the district Inspection, and see that they fulfil their duties. The factory Councils, when they notice that a member of the Inspection does not act as he should, report accordingly to the Inspector, who either himself takes measures to arrange matters, or communicates the affair to the Ministry of Finance.

An experience of seven years has shown how well-timed and expedient was the law of June 3, 1886. Owing to the energy and impartiality of the members of the Inspection, and to the confidence which the manufacturers and workmen have in them, and also owing to the severity of the Councils, the said law is punctually fulfilled, and together with it more rational relations between the manufacturers and workmen are established. An important fact is that those abnormal conditions in the lives of the factory workman, which formerly had such a bad influence on his pecuniary circumstances, and especially on his wages, are nearly done away with. Thus, for example, in 1886 many manufacturers quite gave up the practice of fining their employees, without damaging in the least, as they themselves acknowledged, the quality and regularity of the work. In other factories the fine existed, but its dimensions formed but one-half or one-third of those of former years; the custom was continued only as a disciplinary measure, and its limits were established by law.

Thus, the above question, whether the earnings of the workman are decreased without his consent in consequence of his unequal relations with his master, can be answered negatively. Of course, even now, as everywhere, there are manufacturers who transgress the law, but they form an exception, and their number decreases every year, owing to the vigilance of the Inspection.

It is now time to examine the second subject of the present article, which is so closely connected with the first, and which treats of the number of the working hours per day in Russian works and factories.

About ten years ago the Russian manufacturers had the right to make their workmen of different ages and sexes work all the year round, not excepting Sundays and holidays, and at all hours of the day and night. Children, 6 or 7 years old, young lads, girls and women, all worked as much and as long as the men. But in the eighties the Government found it necessary, following the example of the Western European countries, to protect the youth working in factories. In 1882 a law, completed in 1884 and in 1890, was published, which absolutely prohibited

the employment of children under 12 in factories; children from 12 to 15 are allowed to work only in the day time, and that not more than eight hours, with a rest-hour after four hours of work, or else six hours only without any rest. The night hours, in which children between 12 and 15 years are not permitted to work, are defined according to law to be from 9 o'clock in evening to 5 o'clock in the morning. Furthermore, no work can be demanded of them on holidays, Sundays and high feast days. On such days children can work only on extreme occasions, as an exception, and then even every time it must be sanctioned by the local powers. Simultaneously with this law, the Factory Inspection, as has been already mentioned, was organized.

In 1884 the manufacturers of the government of St. Petersburg raised the question concerning the necessity of prohibiting by law night work for workmen of all categories, and in all factories except those which work such productions as do not allow of interruption. However, the Government did not find it the time to fully satisfy the demand of the St. Petersburg manufacturers, as those of the other localities in Russia made vigorous protests against the proposition. Therefore, night work was prohibited only to workmen of certain categories and in special factories, namely: in 1885 a law was established, confirmed in 1886, which prohibited night working to lads and girls from 15 to 17 years old inclusively, as well as to grown-up women, in cotton mills, wool, flax and tissue factories, that is, in such establishments where women work most, forming 77 per cent of women working in other factories. Besides, through the intercession of the manufacturers of central Russia, the working day is increased by two hours, as compared to what was established by the law of 1882 for minor workmen; the night was thus diminished by 2 hours also, being fixed from 10 to 4 o'clock in the morning.

Such a modification of the law of June 1, 1882, was made with the aim of giving the minor workmen and women the possibility of working not 8 hours in each relay, as was before the case, but nine hours a day.

As to adult workmen, they are allowed until now to work any hour of the day or night, all the year round, as they please. They generally work twelve hours out of the 24, either without interruption, which happens however seldom, or with a rest after six hours work, but with such a calculation that the same workmen should not work two nights running.

It must be, however, observed that there are few factories in Russia, not more than 20 per cent, in which work is going on all the 24 hours; to such belong factories which have to work without interruption, *à feu continu*, as for instance, glass works. In some manufacturing regions, as for example in the St. Petersburg and its neighbouring governments, as well as in the Baltic and Vistula provinces, working 24 hours a day exists only as an exception. Day and night work is principally practised in factories of central Russia, in the governments of Moscow, Vladimir and others; but even there work at night is considered a heavy burden, both on the manufacturers and on the workmen. Therefore, the question of exterminating night work over all Russia, and for all classes of workmen, either by law or by mutual agreement between the manufacturer and the employee, is only a question of time, and without doubt not far distant.

The predominating type of work in Russia, as has already been mentioned, is

day work. But a great difference is observed in the duration of the working day, and in the number of working hours, not only in the separate localities of Russia and in different productions, but even in factories of the same locality and occupied in the same production. This difference, in some cases amounts to 10 hours a day; thus, in some factories of the same class, a working day lasts 18 hours, and in others, only 8 hours. In the same way a great difference is noticed in the time when the work begins and ends, as may be seen from the following table.

BEGINNING OF A WORK DAY.	END OF A WORK DAY.	DURATION OF A WORK DAY	BEGINNING OF A WORK DAY.	END OF A WORK DAY.	DURATION OF A WORK DAY.
At 4 o'clock morning.	At 10 o'clock evening.	18 hours,	At 7 o'clock morning.	At 7 o'clock evening.	12 hours.
5 » »	5 » »	12 »	7 » »	8 » »	13 »
5 » »	6 » »	13 »	7 » »	9 » »	14 »
5 » »	7 » »	14 »	8 » »	5 » »	9 »
5 » »	8 » »	15 »	8 » »	6 » »	10 »
6 » »	4 » »	10 »	8 » »	7 » »	11 »
6 » »	5 » »	11 »	8 » »	8 » »	12 »
6 » »	6 » »	12 »	8 » »	9 » »	13 »
6 » »	7 » »	13 »	9 » »	5 » »	8 »
6 » »	8 » »	14 »	9 » »	6 » »	9 »
6 » »	9 » »	15 »	9 » »	7 » »	10 »
7 » »	4 » »	9 »	9 » »	8 » »	11 »
7 » »	5 » »	10 »	9 » »	9 » »	12 »
7 » »	6 » »	11 »	10 » »	9 » »	11 »

In general, Russian factories in which the working day begins not earlier than 5 o'clock in the morning and does not end later than 9 o'clock in the evening, form 74 per cent; of these the greater number of factories begin their work not at 5 o'clock, but at six and later, to 10 o'clock inclusively, and finish not at 9 but much earlier, at 4 o'clock in the afternoon.

The Russian factories present a great variety as to the number of working hours per day. In some cases the men work 14 to 15 hours a day, and in others only 6, and that with considerable interruptions; the latter case occurs in such factories the production of which is prejudicial to the workmen, as for example, the manufacture of white lead. In any case there are very few factories where the men work more than 12 hours a day, their number forming only 20 per cent, and such factories where the work does not exceed 12 hours, 80 per cent. Of the latter, factories having 12 hours work a day form 36.8 per cent; 11 hours, 20.8 per cent; 10 hours, 18.1 per cent; 9 hours, 2.1 per cent; 8 hours, 1.6 per cent; 7 hours, 0.4

per cent; and 6 hours, 0.2 per cent. Twelve hours work is practised in those factories where the working day lasts $13\frac{1}{2}$ hours, of which $1\frac{1}{2}$ hours are given the workmen for meals. There are, however, factories where the working day lasts also $13\frac{1}{2}$ hours, and the men work only 10 or 11 hours, having $2\frac{1}{2}$ or $3\frac{1}{2}$ hours given them for their meals.

It must however, be observed that since the publishing of the law which prohibits women and minors of both sexes to work at night, owners of such factories which were influenced by this law, have a tendency to organize the working hours in such a way that, instead of the working day lasting $13\frac{1}{2}$ hours, it should last 18, and that two relays of workmen should work nine hours each. This is influenced, on the one hand, by a natural desire of the manufacturer to distribute equally between the working men, women and minors, the number of working hours; and on the other, by the fact that, in thus distributing the time, the owner has the possibility, without great expense, to increase or decrease the production, according to circumstances. Thus, for example, if he possesses in his weaving factory 500 looms, he can have 1,000 workmen weaving on them in two parties of 500, 9 hours at a time. If, in case of need, he wishes to reduce the production, he has only to dismiss half of his workmen, and with the rest to work 12 hours a day, on the same looms and in the same appartments.

More detailed information concerning the wages paid to workmen of different categories, and on various factories, may be had from the next Chapter.



CHAPTER XXVIII.

Data showing the wages paid to workmen in factories.

I.		Maximum. Minimum. R o u b l e s.	
COTTON MANUFACTURE.			
The yearly average earnings of a workman amount to 157.83 roubles.			
	Maximum. R o u b l e s.	Minimum.*	
Fluctuations	220	112.32	
The monthly earn- ings of:			
Sorters	19	5.75	
Cotton peelers	26.4	6.4	
Spreaders	16.5	6.24	
Combers	38	12	
Linen cloth makers	15.5	6.40	
Bolt makers	26.4	8.5	
Frame tenders	18.75	5.20	
Ribbon makers	16.5	6	
Spinners	48	13	
Doffers	16	8.4	
Twisters	18	8	
Creelers	15	5.5	
Frame tenders	28.8	5	
Winders of yarn on reels	19.2	6	
Aids of a frame spinner	55	20	
Winders of yarn on bob- bins	24	8	
Machinists	75	24	
Steam mechanics	30	15	
Gas lighters	26	20	
II.		Maximum. Minimum. R o u b l e s.	
COTTON-WEAVING INDUSTRY.			
The yearly average earn- ing of a workman is .		174.98 roubles	
	Maximum. R o u b l e s.	Minimum.	
Fluctuations	253.44	127.9	
Monthly earnings of:			
Weavers, man or woman	33.60	4.5	
Overseers of weavers .	55	14.5	
Warpers	24	9.85	
Yarn winders	20	4.25	
Sizers	41.30	11.80	
Binders	26	9	
Sorters	23.5	7	
Aids	14.5	2.10	
Slay makers	33.40	17.90	
Rejecters of goods . .	34	9.2	
Locksmiths and turners .	42	12.5	
Blacksmiths	32	14.8	
Hammerers	20	9.15	
Steam mechanics . . .	75	15.5	
Stockers	24	10	

* The minimum wages are paid to new workmen, as also to women and children. The difference of the pay depends on the various localities, sometimes on the season, and on other conditions. When the pay is per piece, as is the case in many manufactories, the weekly average earnings are calculated according to the greatest amount of work which can be possibly done.

III.		
COTTON-SPINNING AND WEAVING INDUSTRIES.		
The yearly average earning ing of each workman amounts to 152.88 roubles		
	Maximum.	Minimum.
	R o u b l e s.	
Fluctuations	201.5	120.9
Monthly earnings of:		
Overseer in the weaving section	55	17
Overseer in the spinning section	56.4	15
Weaver, man or woman	33.60	7
Spinners	42.25	12
Sorters	25	5
Peelers	25	5
Sharpeners	21	8.7
Combers	19	7.2
Linen cloth-makers . . .	15	5.5
Ribbon makers . . . ,	16.90	5.3
Frame tenders	19	5.3
Doffers	16.7	5
Twisters together . . .	18	8
Creelers	16.5	5
Smoothers	17.60	5
Frame tenders	20	5.25
Twisters	24.15	4.32
Winders	19.8	4.15
Warpers	23.90	7.5
Drawers-in	24	4.5
Sizers	41.30	12
Binders	27	7.50
Slay makers	36	8
Rejecters of goods . . .	35	9
Packers	24	8
Smiths	42	6
Blacksmiths	37	8
Hammerers	21.6	8
Steam mechanics	75	12
Gas lighters	27	10
Simple workmen	20	6

IV.		
THE DYEING, WHITENING, STARCHING, AND PRINTING OF TISSUES.		
The yearly average earning of each workman amounts to 192 roubles		
	Maximum.	Minimum.
	R o u b l e s.	
Fluctuations	241.92	156
Monthly wages of:		
Whiteners	16.8	13

	Maximum.	Minimum.
	R o u b l e s.	
Dyers	20.4	12
Printers	24	14
Teasellers	20.60	20
Simple workmen	12	6.5

V.		
THE MANUFACTURE OF CHINTZ AND KER- CHIEFS, AND THE DYEING OF COTTON TIS- SUES.		
The yearly average earning of a workman amounts to 180 roubles		
	Maximum.	Minimum.
	R o u b l e s.	
Fluctuations	—	—
Monthly wages of:		
Printers	33	6.10
Drawers	120	4
Engravers	80	10.5
Whiteners	36.5	5.36
Dyers	31	5
Indigo dyers	18.5	5
Calendriers	25	6
Steamers	29.3	6
Packers	22	6.30
Calico printers	105	12
Starchers	14	6.5
Pressers	42	7
Rollers	35	19.5
Mechanicians	70	4
Joiners and carpenters .	40	15
Chemists (Laboratorists).	35	6

VI.		
TAPE, GALLOON, LACE AND TRIMMING MANU- FACTORIES.		
The yearly average earnings of a workman amount to 171.6 roubles.		
	Maximum.	Minimum.
	R o u b l e s.	
Fluctuations	273	160
Monthly wages of:		
Weavers	65	13
Warpers	25	17
Reelers	12	6
Spoolers	16.5	5
Winders	21	6.5
Finishers	18.5	8.70
Affixers of seals	6.25	3.75
Dyers	22.5	13.5
Machinists	55	16

VII.

TULLE MANUFACTORY.

The yearly average earnings of a workman amount to 235.30 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	235.3	—
Monthly wages of:		
Weavers	65	30
Darners	22	6.5
Trimmers	17.30	10.2
Spoolers	17.30	6.5

VIII.

WOOL-SPINNING AND WOOL-COMBING MANUFACTORIES.

The yearly average earnings of a workman amount to 190.56 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	239	152.64
Monthly wages of:		
Peelers	24	10
Combers	20.20	10
Cleaners	26.40	10
Spinners	39	24
Twisters	13.2	7.20
Winders	21.6	10
Aids	15.6	12
Packers	25	9.20
Black- and locksmiths . .	60	32

IX.

SPINNING OF VIGOGNE WOOL.

The yearly average earnings of a workman amount to 139.18 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	218.88	106.56
Monthly wages of:		
Sorters	27	7.6
Combers	20.60	12
Cleaners	24	16
Spinners	29	11
Twisters	18.70	8
Twisters together . . .	12.5	8
Winders	14.50	8.40
Dyers	20.60	11
Packers	17	9.80
Aids	5.5	4

X.

SPINNING OF CARDED WOOL (WORSTED).

The yearly average earnings of a workman amount to 156.71 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	178.56	129.60
Monthly wages of:		
Sorters	35.20	14.40
Spinners	38.40	28.80
Combers	20.20	13.20
Twisters together . . .	13.20	7.20
Twisters	18.20	10.80
Winders	18	7.20
Aids	19	10.80
Washers	20.40	12
Repairers	21.60	16.80
Dyers	20.40	16
Packers	21	7.20

XI.

SPINNING OF ARTIFICIAL WOOL.

The yearly average earnings of a workman amount to 173.85 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	200	89.24
Monthly wages of:		
Sorters	11	7
Combers	19.2	12
Washers	17.50	9.6
Dyers	19.20	12.5
Spinners	25	11
Stokers	25	20

XII.

MECHANICAL AND HAND WEAVING OF WOOL.

The yearly average earnings of a workman amount to 214.71 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	279.36	135.36
Monthly wages of:		
Warpers	37	10
Spoolers	18	3.65
Reigers	26.4	18
Aids	12	9.60
Twisters	36.3	13.2
Winders	18	5.35
Pluckers	16.8	10.4
Darners	38.4	11.3
Weavers	35	8.3
Sizers	21.6	8

	Maximum. R o u b l e s.	Minimum.
Tiers of warp	50	25
Packers	21.6	8
Steamers	66	25
Carpenters	29	15
Smiths	26	5

XIII.

SPINNING AND WEAVING OF WOOL, AND THE
FINISHING DEPARTMENT.

The yearly average earnings
of a workman amount to 197.02 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations.	225.6	133.4
Monthly wages of:		
Machine weavers	37	7
Hand »	32	16
Warpers	27.90	10
Spoolers	14	5
Cleaners	12	5
Darners	12	5
Unwinders	7	6
Twisters	8	6
Apparatus-men	32	25
Peelers	11	8
Spreaders.	10	6.5
Spinners	48	16
Cloth fullers.	20	5
Ring-frame tenders	10	7
Steam mechanics and stockers	20	14
Black- and locksmiths	32	16

XIV.

CLOTH MANUFACTORY.

The yearly average earnings
of a workman amount to 174.5 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations.	240.70	124.47
Monthly wages of:		
Machine weavers	45	13
Hand »	22	10
Washers	26	9.30
Dryers	25	5.5
Pressers	40	9.70
Shearers	45	4.25
Combers	25	6
Dyers	28	10
Machine warpers	25	4
Hand »	39	14
Spoolers	16	2
Cleaners	16.8	7
Unwinders	12	4.5

Maximum. Minimum.
R o u b l e s.

Twisters	16	4
Colour-fixers	25	6
Cleaners of apparatus	20	8
Peelers	20.5	3.60
Spreaders.	16.5	4
Spinners	43	12.5
Clothfullers	26	6.80
Frame-makers	17.5	6.40
Cloth-makers	12	4
Frame-spinners.	34	5.10
Sorters	32	12
Worsted makers	35	13
Steamers	50	16
Black- and locksmiths	50	10

XV.

CLOTH-TRIMMING MANUFACTORY.

The yearly average earnings
of a workman amount to 134.7 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations.	—	—
Monthly wages of:		
Washers	13	12
Dryers	13.5	12.5
Pressers	15	12
Sheares.	11	7
Combers	12	10
Dyers	15	13.5
Colour-fixers	13.5	12
Cloth-fullers.	12.5	11.5
Steamers	25	18

XVI.

WOOL-WEAVING, PRINTING AND DYEING MANU-
FACTORIES.

The yearly average earnings
of a workman amount to 169 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations.	174.5	164.5
Monthly wages of:		
Machine weavers	37	9
Hand »	34	11.8
Steamers.	15	11
Chemists	15	10
Whiteners	15	10
Washers	20	10
Dryers	16	8.75
Pressers	12.5	11.5
Shearers, combers	30	9
Dyers	15.5	10
Sizers	21	10
Tiers of warp	35	14.13

Maximum. Minimum.
R o u b l e s.

Machine and hand warp- ers	30	16.5
Peelers and cleaners . .	24	6.5
Unwinders of wool . .	12	7.5
Winders of warp . . .	27.5	8
Twisters	27	8
Kerchief printers . . .	27	19.5
Colour-fixers	20	11
Loom tacklers	16	12
Steamers	45	27
Stokers	25	10
Smiths.	36	21
Blacksmiths	35	20
Hammerers	15	12

XVII.

DYEING AND SETTING OF COLOURS ON WOOLLEN
TISSUES, CLOTH AND TWEEDS.

The yearly average earnings
of a workman amount to 174.85 roubles.

Maximum. Minimum.
R o u b l e s.

Fluctuations	218.88	138.28
Monthly wages of:		
Fullers	20.2	13.2
Teasellers	21.4	12
Shearers	16.8	9.2
Dryers	25.2	10.5
Pluckers	17.30	9.10
Pressers	22.8	12.5
Dyers	21.6	11.5
Rollers	10.8	9
Washers	21.3	12.6
Packers	17.5	10.8

XVIII.

HAT MANUFACTORY.

The yearly average earnings
of a workman amount to 206 roubles.

Maximum. Minimum.
R o u b l e s.

Fluctuations	245.09	156
Monthly wages of:		
Fullers	32	20
Trimmers	20	12
Ironers	20	20
Shapers	51.5	17.5
Dyers	21.5	17.5

XIX.

SILK-WEAVING MANUFACTORY.

The yearly average earnings
of a workman amount to 207.10 roubles.

Maximum. Minimum.
R o u b l e s.

Fluctuations	256	141.7
Monthly wages of:		
Machine weavers	42	10.89
Hand »	31.7	16.5
Spoolers	10.5	4
Winders	22.3	5.66
Teasel-cleaners	14	4.74
Machine warpers	28.7	7.5
Hand »	18.37	14.34
Cleaners	16	5
Pressers	23	10.2
Dyers	19	10.2
Twisters	34	23
Folders	26	14
Warp-tiers	26	20
Locksmiths	46	18
Steamers	24	14

XX.

SILK LACE MANUFACTORY.

The yearly average earnings
of a workman amount to 436.8 roubles.

Maximum. Minimum.
R o u b l e s.

Fluctuations	436.8	—
Monthly wages of:		
Chief workmen	85	10
Tulle makers	123	108.8
Dyers	60	32
Workmen	25	13.4
Workwomen	12.5	9.6

XXI.

VELVET MANUFACTORY.

The yearly average earnings
of a workman
amount to 211.10 roubles.

Maximum. Minimum.
R o u b l e s.

Fluctuations	211.10	—
Monthly wages of:		
Hand weavers	32	12
Machine weavers	24	12
Warpers	16	8
Spoolers	12	6
Winders	12	6
Pickers	12	6
Cleaners	12	6

XXII.

SPINNING AND COMBING OF FLAX.		
The yearly average earnings of a workman amount to 116.35 roubles.		
	Maximum.	Minimum.
	R o u b l e s.	
Fluctuations	155.4	111.76
Monthly wages of:		
Weavers	22.25	7.5
Combers	12	4.5
Ribbon makers	10.25	4.5
Frame tenders	10.25	3.5
Wadding-makers	12.50	3.5
Twisters	15	9.25
Twiners	12	5

XXIII.

SPINNING AND WEAVING OF FLAX.		
The yearly average earnings of a workman amount to 124.31 roubles.		
	Maximum.	Minimum.
	R o u b l e s.	
Fluctuations	128.10	112.15
Monthly wages of:		
Cord-makers	13.7	10.5
Wadding-makers.	17.7	7.14
Doffers	7.2	3.60
Twisters	12	7.90
Card-tenders	9.8	6.30
Spreaders	13.2	7.20
Frame tenders	11	9
Ribbon-makers	9.12	6.3
Dryers	17.4	14.30
Packers	20.4	4.90
Winders	20.7	4.90
Combers	28.7	9.60
Weavers, man or woman	20.60	7.90
Sizers	27.8	14
Warpers	25	20
Spoolers	17	4.5

XXIV.

SPINNING AND WEAVING OF FLAX, AND THE BLEACHING OF LINEN.		
The yearly average earnings of a workman amount to 128.46 roubles.		
	Maximum.	Minimum.
	R o u b l e s.	
Fluctuations	139.17	119.5
Monthly wages of:		
Wadding-makers	16.8	7.90

Maximum. Minimum.
R o u b l e s.

Twisters	11.2	7.90
Doffers	8.4	3.6
Reelers	12	6
Dryers	15	11
Card-tenders	13	6.7
Hecklers	10.3	8.4
Ribbon-makers	12	3.6
Frame tenders	10.3	7.44
Winders	21	8
Combers	27	6
Weavers	26	8
Warpers	25	12
Unwinders	15	6
Spoolers	9	3.5
Bleachers	24	5.5

XXV.

FLAX-WEAVING MANUFACTORY.		
The yearly average earnings of a workman amount to 145 roubles.		
	Maximum.	Minimum.
	R o u b l e s.	
Fluctuations	145	—
Monthly wages of;		
Weavers	21.16	9.8
Machine spoolers	16.9	11.80
Hand spoolers	6.85	3.08
Cop winders	7.75	3.25

XXVI.

LINEN-BLEACHING MANUFACTORY.		
The yearly average earnings of a workman amount to 185.36 roubles.		
	Maximum.	Minimum.
	R o u b l e s.	
Fluctuations	185.36	—
Monthly wages of:		
Boilers and dryers of yarn	19.03	14.51
» of linen	18.4	15.5
Washers of linen	21.8	12
Buckers » »	12.13	10.55
Spreaders	19.24	16.10
Dryers and starchers	22	15.50
Calendriers	17	8.90
Beaters	15.95	6.3
Packers	22.2	7.5

XXVII.

PRODUCTION OF LINEN FOR BAGS.		
The yearly average earnings of a workman amount to 144.97 roubles.		

	Maximum. R o u b l e s.	Minimum.
Fluctuations	144.97	—
Monthly wages of:		
Spinners	19.2	8
Sizers	22	20
Unwinders	10	8
Trimmers	15.8	13.2
Seamstresses	12	10
Locksmiths	33	12

XXVIII.

PRODUCTION OF ARTICLES IN JUTE.

The yearly average earnings of a workman amount to 166.89 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	193.26	132.48
Monthly wages of:		
Spinners	21.6	9.60
Twisters	19.20	8.80
Warpers	13.6	12
Weavers	26.4	12.5
Smoothers	19.2	12
Reelers	15	9.60
Scutchers	28.8	12
Finishers	16.3	15
Machinists	40	24
Packers	36	7.70

XXIX.

PRODUCTION OF GUTTA-PERCHA ARTICLES.

The yearly average earnings of a workman amount to 260.71 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	402.2	257.65
Monthly wages of:		
Weavers	58	13
Finishers	32	—
Warpers	32	17
Winders	17	10.5
Tube makers	38.4	15.6
Cushion and slipper makers	20.4	12
Dryers	28.8	15.6
Paint-makers	19.2	9.80
Strap »	42	18
Surgical instrument-makers	31	9.60
Galosh trimmers	12	9.60
Cutters	38.4	16.8
Polishers	40	19.20
Stretchers	26.4	9.60

	Maximum. R o u b l e s.	Minimum.
Hard gutta-percha makers	36	9.60
Stove men	40	18

XXX.

PAPER MANUFACTURE.

The yearly average earnings of a workman amount to 175.6 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	234	137.10
Monthly wages of:		
Sorters of rags	20	6
» » paper	13	6
Workers on clean rolls	30	17
» » dirty »	20	16
» » paper cutting machines	13	9.60
Calendriers	40	12
Workers on whitening rolls	25	12
» » paper machines	40	11.5
Rag boilers	20	13.20
Chief workmen	75	25
Machinists	50	18
Stokers	25	15
Packers	20	8.40

XXXI.

MANUFACTURE OF PASTÉBOARD AND PITCHED PAPER FOR ROOFS.

The yearly average earnings of a workman amount to 216.08 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	251	166
Monthly wages of:		
Sorters	12	8
Rollers	25	16
Makers of pitched paper	35	28
Machinists	35	12
Stokers	25	20

XXXII.

TAPESTRY MANUFACTURE.

The yearly average earnings of a workman amount to 209.37 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	250	157
Monthly wages of:		
Printers	35	14
Primers	25	13
Colour-rubbers	15.5	10

	Maximum. R o u b l e s.	Minimum.
Rollers	20	8.5
Polishers	22	12
Doffers	11	8.5
Machinists	35	20
Stokers	20	11

XXXIII.

SAWMILLS.

The yearly average earnings
of a workman amount to 237.17 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	290	109.44
Monthly wages of:		
Sawfixers	68	10
Aids	20	7.2
Saw menders	30	20
Pilers	25	10
Plank receivers	22	9.60
Sorters	30	12
Machinists	27	25
Stokers	20	15
Greasers	15	10

XXXIV.

PRODUCTION OF BENT WOOD FURNITURE.

The yearly average earnings
of a workman amount to 176.6 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	250	138.24
Monthly wages of:		
Turners	34	14.4
Benders	30	16.8
Polishers	18.4	7
Varnishers	16	8.4
Glossers	15	9.6
Carpenters	41.5	18
Wood benders	12	9.60
Joiners	45	19.2
Sawers	9.60	—
Menders	17	15.6
Locksmiths	20.4	16.8
Packers	21	9.5

XXXV.

CAST-IRON AND MECHANIC FOUNDRIES.

The yearly average earnings
of a workman amount to 321.74 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	604	180.60

Monthly wages of:

	Maximum. R o u b l e s.	Minimum.
Modellers	96	14.5
Casters	156	14
Coppersmiths	96	16
Locksmiths	120	11.5
Turners and parers	98	16
Trimmers	55	14
Furnace tenders	46	14.5
Rivetters	96	17
Tinners	96	25
Polishers	28	10.8
Hammerers	36	11.5
Different aids	24	3.80
Blacksmiths	100	14.4
Mechanics	120	25
Machinists	140	17
Stokers	29	15

XXXVI.

STEEL FOUNDRY.

The yearly average earnings
of a workman amount to 524.28 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	524.28	—
Monthly wages of:		
Melters	86.5	28.8
Founders	76.5	24
Coppersmiths	67.2	18
Furnace tenders	45.5	25
Casters	86	36
Rollers	90	17
Flatteners	112	36
Softeners	84	24
Smiths and turners	84	24
Gaslighters	38.5	24
Sorters	39.6	25
Stokers	38	15.5
Blacksmiths	51	21.5
Hammerers	33	19.20
Machinists	96	26.8
Aids	24	16

XXXVII.

CONSTRUCTION OF MACHINES AND CARS.

The yearly average earnings
of a workman amount to 300.84 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	393.45	253.8
Monthly wages of:		
Locksmiths and turners	43.6	15
Blacksmiths	52	20

	Maximum. R o u b l e s.	Minimum.
Hammerers	32	16
Founders	60	34
Casters	60	34
Furnace tenders	40	29
Modellers	38.2	19.5
Joiners and carpenters .	45.6	20.4
Coppersmiths	49	19.5
Planers and borers . . .	39.5	14.7
Melters	40.90	28.7
Painters	43	17.6
Upholsterers	26	24
Machinists	40	—
Stokers	20	—
Apprentices	12.4	7

XXXVIII.

MACHINES AND SHIP CONSTRUCTION, AND
IRON-ROLLING MILLS.

The yearly average earnings
of a workman amount to 337.91 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	462.5	297.5
Monthly wages of:		
Modellers	79	35
Founders and casters . .	96	14.8
Melters	47	26
Planers and borers . . .	93	22
Coppersmiths and riveters	101	24
Shipmakers	59	14
Furnace tenders	38	25
Flatteners and borers . .	96	30
Puddlers	88	35
Settlers and hookers . .	30	17
Wheelmakers	68	26
Brass-smiths	75	15
Blacksmiths	98	19
Hammerers	50	18
Machinists	60	24
Stokers	35	12

XXXIX.

TUBE AND COPPER-ROLLING MILLS AND
FOUNDRIES.

The yearly average earnings
of a workman amount to 329.9 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	329.9	—
Monthly wages of:		
Flatteners	80	14.4

	Maximum. R o u b l e s.	Minimum.
Cutters	48	16.5
Matchers	50.5	26.5
Furnace men	77	15.5
Brass-smiths	48	35
Rollers	41	24
Burnishers	32	—
Shearers	19	14.5
Modellers	55	40
Founders	52	29

XL.

CONSTRUCTION OF TELEGRAPHS. THE MAKING
OF ELECTRO-TECHNICAL APPARATUS.

The yearly average earnings
of a workman amount to 517.14 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	522	507
Monthly wages of:		
Locksmiths and turners	112	25
Borers and planers . . .	32	21
Blacksmiths	60	36
Hammerers	24	17.5
Coppersmiths and riveters	60	30
Modellers	80	24
Joiners and menders . .	60	38
Tinners and water-layers	65	34
Whitesmiths	65	34
Polishers	31	24
Glossers	50	40
Setters	97	36
Wirewinders	33	19
Machinists	32.5	27
Mechanics	150	36

XLI.

PRODUCTION OF WIRE AND HORSESHOE
NAILS.

The yearly average earnings
of a workman amount to 325.36 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	354.5	275
Monthly wages of:		
Nailmakers	81.6	24
Locksmiths and turners	42	16
Blacksmiths	40	16
Wiremakers	75	19.2
Screw-nut makers	40	16
Sorters and packers . . .	15	10.6

XLII.

PRODUCTION OF SCREWS AND OTHER METALLIC ARTICLES.

The yearly average earnings
of a workman amount to 287.6 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	322	205
Monthly wages of:		
Locksmiths	100	16
Turners	54	13
Stampers	35	21
Drawers	40	21
Workers on machines	50	12
Modellers	54	27
Box makers	36	26
Packers	14.5	7.5

XLIII.

PRODUCTION OF ARTISTIC BRONZE AND COPPER ARTICLES.

The yearly average earnings
of a workman amount to 322.3 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	365	315.25
Monthly wages of:		
Founders	36	16
Chasers	36	16
Tinners	45	20
Locksmiths	72	17
Turners	48	24
Repairers	48	24
Varnishers	45	20
Blacksmiths	60	35
Pressers	48	24
Polishers	51	17

XLIV.

PLATED GOODS MANUFACTURE.

The yearly average earnings
of a workman amount to 346.18 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	374	296.10
Monthly wages of:		
Turners	65.2	32
Polishers	56.5	30
Varnishers	50	16.6
Bronze makers	74.5	32
Spoon makers	60	30
Galvanists	45	—

XLV.

PRODUCTION OF PHILOSOPHICAL INSTRUMENTS.

The yearly average earnings
of a workman amount to 477.3 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	570.4	311.77
Monthly wages of:		
Mechanics	83.3	26
Locksmiths	41.5	16.6
Turners	33.5	21
Founders	25	—
Joiners	64	16.6
Glass blowers	37.5	16.6
Painters	37.4	16.6

XLVI.

PRODUCTION OF DECIMAL BALANCES.

The yearly average earnings
of a workman amount to 419 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	475	312
Monthly wages of:		
Chief workmen	60	20
Blacksmiths	75	21.6
Joiners	62	22.5
Locksmiths	75	15
Aids	22	15

XLVII.

PRODUCTION OF LITHOGRAPHIC AND PRINTING MACHINES.

The yearly average earnings
of a workman amount to 412.4 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	412.4	—
Monthly wages of:		
Blacksmiths	51.5	32
Locksmiths	52.5	26.5
Turners	55	34.5
Joiners	46.5	41
Aids	33	27
Apprentices	21	4.8

XLVIII.

LAMP MANUFACTURE.

The yearly average earnings
of a workman amount to 263.10 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	405	181.2

	Maximum. R o u b l e s.	Minimum.
Monthly wages of;		
Founders	65	4.5
Bronze makers	40	15
Whiteners	58.5	6.5
Turners	75	4.5
Varnishers	40	10.8
Locksmiths	30	—

XLIX.

CHEMICAL INDUSTRY.

The yearly average earnings
of a workman amount to 282.10 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations.	350	135.36
Monthly wages of:		
Retorters.	30	20
Charcoal burners	29	16
Workmen of the chem- ical section	25	20
Acid makers	16	12
Varnish makers	12	—
Lock- and blacksmiths	90	30

L.

MATCH INDUSTRY.

The yearly average earnings
of a workman amount to 121.62 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations.	201.52	88.54
Monthly wages of:		
Machinists	55	24
Stokers	18	17
Dryers	19.2	12
Doffers	24	6
Packers	18	3
Casemakers	36	20.7
Cutters of straw	28	6
Dippers	16	8
Box makers	10	2
Band rollers.	9	3

LI.

PRODUCTION OF COLOURS.

The yearly average earnings
of a workman amount to 202.8 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations.	202.8	—
Monthly wages of:		
Millers	35.10	—

	Maximum. R o u b l e s.	Minimum.
Workmen	16.6	15.2
Working women	12.5	6.40
Machinists	36.5	—
Joiners	34.4	—

LII.

GLASS MANUFACTURE.

The yearly average earnings
of a workman amount to 244.7 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations.	363	102.11
Monthly wages of:		
Blowers	140	19.20
Polishers.	50	7.2
Drawers	72	16
Moulders.	10	5
Potters	30	17
Glass melters	75	13
Stokers	20	15
Cutters	20	16
Jar makers	15	3
Aids	7	3

LIII.

CEMENT MANUFACTURE.

The yearly average earnings
of a workman amount to 189.24 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations.	246.7	164.16
Monthly wages of:		
Millers	40	11.5
Stone hewers.	35	30
Breakers.	25	16
Weighers	18	14.5
Dryers	25	12
Burners	23	12
Twirlers	18	12
Doffers	25	12
Machinists	45	30
Workers at the elevator	22	16
Workers at the Gertelev machine	25	16

LIV.

PRODUCTION OF CERESIN AND PARAFFIN.

The yearly average earnings
of a workman amount to 211.8 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations.	211.8	—

	Maximum. R o u b l e s.	Minimum.
Monthly wages of:		
Workmen	12	9
Packers	8	6.5
Locksmiths	28	26
Candle makers	21.5	17

LV.

EARTHENWARE MANUFACTURE.

The yearly average earnings
of a workman amount to 191.6 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations.	191.6	—
Monthly wages of:		
Chief moulders	31	17
Apprentices	17	8.5
Drawers	36	9
Trimmers.	14.5	9
Workmen	12.5	6

LVI.

BRICK MANUFACTURE.

The yearly average earnings
of a workman amount to 164.9 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations.	264	121.4
Monthly wages of:		
Burners	40	12
Moulders	35	12
Loaders and unloaders	20	8
Kneaders.	21	11
Wheelers.	17	10

LVII.

STONE-CUTTING INDUSTRY.

The yearly average earnings
of a workman amount to 388 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations.	430	360
Monthly wages of:		
Cutters	48	36
Hewers	45	31
Polishers.	66	21
Aids	16	14.5

LVIII.

FLOUR MANUFACTURE.

The yearly average earnings
of a workman amount to 305.6 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations.	373.3	230.4
Monthly wages of:		
Millers.	55	21.6
Stenters	28.8	24
Valveitters	24	16.3
Cleaners	36	16.8
Incisers	38.4	28.8
Greasers	31	24
Common workmen.	27	9
Machinists	36	28

LIX.

CHOCOLATE MANUFACTURE.

The yearly average earnings
of a workman amount to 190.6 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations.	204	148.44
Monthly wages of:		
Chief workmen.	85	25
Caramel makers	30	9
Chocolate makers	25	9
Packers	20	9
Daily workmen.	9.5	7.2

LX.

DISTILLERIES OF VODKA.

The yearly average earnings
of a workman amount to 254 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations.	434	166
Monthly wages of:		
Distiller	83	70
Bottlers	24	11
Rinsers	17	5.5
Band-rollers.	22	16
Packers	17	11
Coal-men.	16	14
Machinists	25	24
Stokers	15	13

LXI.

CHICORY MANUFACTURE.

The yearly average earnings
of a workman amount to 202.6 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations.	202.6	—
Monthly wages of:		
Chief workmen.	55	—
Mechanics	35	—
Corkers	39	31

	Maximum. R o u b l e s	Minimum.
Packers	31	21
Boxmakers	15	7.5

LXII.

MACARONI MANUFACTURE.

The yearly average earnings
of a workman amount to 210.83 roubles.

	Maximum. R o u b l e s	Minimum.
Fluctuations	210.83	—
Monthly wages of:		
Kneaders	35	30
Pressers	23	18
Dryers	30	8
Packers	30	8
Chief workmen	38	—

LXIII.

BEER AND MEAD BREWERIES.

The yearly average earnings
of a workman amount to 211.3 roubles.

	Maximum. R o u b l e s	Minimum.
Fluctuations	300	170
Monthly wages of:		
Maltmen	56	14
Mash makers	23	13
Fermenters	56	13
Bottlers	30	14
Rinsers	28	9
Coopers	48	20
Barrel steamers	25	13
Stokers	45	18
Gas lighters	18	14
Blacksmiths	45	30
Carpenters	35	12
Chief workmen	86	45

LXIV.

BEET SUGAR PRODUCTION AND SUGAR
REFINERIES.

The yearly average earnings
of a workman amount to 159.60 roubles.

	Maximum. R o u b l e s	Minimum.
Fluctuations	307.95	115.76
Monthly wages of:		
Machinists	60	20
Apparatus men	36	11
Helpers to machine feeder	24	11

Maximum. Minimum.
R o u b l e s.

Workmen of the beet section	11	7
Diffusers	9.5	6
Workmen of the filtering section	16	8
Whiteners	19	13
Steamers	9	6
Chief workmen	30	7
Half-workmen *	11	3.5

LXV.

TOBACCO FACTORIES.

The yearly average earnings
of a workman amount to 147.10 roubles.

	Maximum. R o u b l e s	Minimum.
Fluctuations	250	117
Monthly wages of:		
Machine crumbers	40	17.2
Hand »	58	12
Cigar makers	40	10
Cigarette makers	30	7.2
Sorters	48	4
Fillers	50	10
Gluers	27	8
Dryers	34	8
Paper cutters	36	10
Workers on case machines	21	9.6
Band-rollers	21	8
Packers	33	9.6
Machinists	70	20
Chief workmen	70	40

LXVI.

LEATHER MANUFACTURE.

The yearly average earnings
of a workman amount to 328.57 roubles.

	Maximum. R o u b l e s	Minimum.
Fluctuations	402	228
Monthly wages of:		
Tanners	50	12
Cleaners	40	16
Groovers	86	20
Cutters	48	24
Shagreen makers	28	16
Aids	20	9
Machinists	45	30

* In the refineries of southern Russia working women and minors, workmen and women are called «half workmen».

LXVII.

PRODUCTION OF LEATHER ARTICLES.

The yearly average earnings
of a workman amount to 500 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	500	—
Monthly wages of:		
Chief workmen	50	15.5

LXVIII.

MACHINE PRODUCTION OF BOOTS AND SHOES.

The yearly average earnings
of a workman amount to 292.28 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	292.28	—
Monthly wages in:		
The cutting section	58.76	38.8
» sewing »	41.7	21.7
» tightening »	77	39.5
» heel-making »	64.2	43.9
» trimming »	51.3	36.4
» preparatory »	57.3	28
» felt-making »	56.1	26.9
» trunk-making »	49.9	24.5

LXIX.

STEARINE MANUFACTURE.

The yearly average earnings
of a workman amount to 190.6 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	190.6	—
Monthly wages of:		
Chief workmen	45	35
Common »	21	12.5
Workwomen	11	6

LXX.

SOAP MANUFACTURE.

The yearly average earnings
of a workman amount to 218 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	218	—
Monthly wages of:		
Soapboilers	81.5	—
Chemists	60	—
Apparatus men	43	—
Workmen	30	6

LXXI.

ALBUMEN MANUFACTURE.

The yearly average earnings
of a workman amount to 294.6 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	294.6	—
Monthly wages of:		
Blooders	22	—
Dryers	23	—
Workmen	17	—
Stokers	30	—
Locksmiths	30	—

LXXII.

BRUSH AND COMB MANUFACTURE.

The yearly average earnings
of a workman amount to 195.2 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	283.4	137.5
Monthly wages of:		
Workmen	60	7.5
Women	14	3.60

LXXIII.

BONE-BURNING INDUSTRY.

The yearly average earnings
of a workman amount to 245.4 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	245.4	—
Monthly wages of:		
Workmen	50	13
Women	15	10
Stokers	60	45

LXXIV.

TYPOGRAPHIC INDUSTRY.

The yearly average earnings
of a workman amount to 308.42 roubles.

	Maximum. R o u b l e s.	Minimum.
Fluctuations	388.9	195.65
Monthly wages of:		
Clickers	70	50
Engravers	120	25
Casemen	75	10
Lithographers	55	20
Bookbinders	40	10
Letter founders	35	12
Machine feeders	20	14
Printers	18	14
Phototypers	90	20
Apprentices	12	4
Machinists	96	24

CHAPTER XXIX.

The Industries of the Grand Duchy of Finland.

AGRICULTURE, forestry and cattle breeding form the principal sources of livelihood of the people of Finland. The industrial activity of the country, except so far as it is based on work connected with the products of these three leading industries, plays therefore a comparatively little important part in the economic life of the people. The chief obstacle to a wider development of its industry appears to be the lack of different kinds of raw materials. For this reason, the industrial products exported to Western Europe, or to countries lying beyond Europe, are almost exclusively restricted to articles that are the production of forest industry, namely: all kinds of wood materials, splints for matches, pitch, pasteboard, wooden paper pulp, et cetera. The articles transported to the neighbouring districts of Russia are somewhat more varied, and include, besides those already mentioned, iron and iron wares, cotton and flax goods, skins and hides, glass and earthenware articles.

The extent to which the industrial productiveness of Finland has been allowed to develop has with rare exceptions been restricted to supplying the very limited wants of the country itself, and this of course has given a peculiar form and cast to this branch of national activity. A by no means unimportant hindrance to the enlivenment of Finnish industry is to be found in the relatively small capitals at the disposal of the inhabitants of the country, as well as to the slow growth of national wealth; whilst foreign capital is attracted on no great scale, in consequence of an insufficient acquaintance on the part of foreigners with the actual economic organization of the country, and the necessary conditions of its industrial productiveness.

The following review is mainly confined to a period of five years, from 1886 to 1890. Information relating to earlier periods is either extremely defective, or drawn up on a scheme so different to the plan adopted at present, that any statistical comparison is out of the question. At the same time, the review has as far as possible been made so as to include periods earlier than the years just mentioned.

It is necessary to remark that the figures given in the subjoined tables embrace not only the manufactured, but also the trade productions of the country, so far as the latter are worked with the aid of hired hands in workshops, but do not include the so-called village hand industries. Only a few of the village trades, which in general bear the character of village hand work industry, will therefore be tabulated for the sake of comparison. In the trade returns for Finland no difference has during the last few years been made between factory and trade industries, so that in many cases it is almost impossible to draw any definite line of distinction between them.

The general proportions of industrial activity in Finland, as well as the extent of its development during the last five years, are set forth in the following table, which shows the number of manufacturing houses (works, factories and workshops) and also the gross value of the products, in Finnish marks, reckoned at forty kopecks.

Y E A R S.	FACTORY AND TRADE INDUSTRY.			METALLURGIC, ENGINE BUILDING AND OTHER METAL INDUSTRIES.			T O T A L.					
	Number of manu- facturing houses.	Number of work- men.	Value of prod- uct in marks.	Number of manu- facturing houses.	Number of work- men.	Value of prod- uct in marks.	Number of manu- facturing houses.	Increased per- centage.	Number of work- men.	Increased per- centage.	Value of prod- uct in marks.	Increased per- centage.
1886	4,625	34,877	94,779,580	—	—	14,868,700	—	—	—	—	109,648,280	—
1887	4,864	36,304	100,588,479	880	7,228	14,719,342	5,744	—	43,532	—	115,307,821	5.1
1888	5,141	38,330	108,130,126	930	7,996	16,103,324	6,071	5.8	46,326	6.4	124,233,450	7.7
1889	5,384	44,729	133,902,033	868	8,827	18,769,550	6,252	3.0	53,556	15	152,671,583	23
1890	5,551	49,137	141,748,290	937	9,706	23,593,678	6,488	3.8	58,843	9.8	165,341,968	8.2

As is shown in the above table, the industry of the country, during the period it embraces, increased with comparative rapidity, and the gross value of the yearly product has since 1886 increased by 55,693,688 marks, that is to say, 50 per cent. This increase has been mainly caused by the favourable economic conditions that prevailed during this period, among which the rich harvest of these five years, and the energy with which the ways of communication were improved, a whole network of railways was formed, and a sea passage with Western Europe was opened up and established, must be reckoned as the leading and principal factors. The most favourable year in these respects appears to have been 1889, in which the increased industrial activity of the country is most patent and evident.

As the population of Finland at the end of the year 1890 amounted to 2,380,140 souls, the number of work people engaged in its different industries amounts to 2.5 per cent of the entire population. If the gross value of the industrial product of the same year be distributed among the whole population, the average sum for each inhabitant of the country will be 74 marks.

The average number of work people in each of the works, as well as the average

value of the gross product for each factory and each workman, may be gathered from the following table.

Y E A R S.	VALUE OF GROSS PRODUCT IN FINNISH MARKS.		
	AVERAGE NUMBER OF WORKMEN IN EACH OF THE WORKS.	ON AN AVERAGE FOR EACH OF THE WORKS.	ON AN AVERAGE FOR EACH OF THE WORK PEOPLE.
1887.	7.6	20,074	2,646
1888.	7.6	20,463	2,682
1889.	8.6	24,420	2,851
1890.	9.0	24,489	2,810

The figures in the first two columns sufficiently prove the large increase in the more important manufacturing industries of the country. The increase in the value of gross product for each of the work people is apparently explained by an increased intensiveness in the work, and by the greater use of engines and machinery power. Of all the industrial works, the largest number of hands is employed in the cotton mills of Finleyson and Company at Tammerfors, amounting in 1890 to 2,076, the value of the product being 6,200,000 marks. The next in order are the cotton mills, also at Tammerfors, of the joint-stock company, Forssa, with 1,232 work people, the value of the production being 4,400,000 marks.

The industrial activity of the country in 1891 was divided between its towns and villages in such a way that about 50 per cent of its factories and works, about 52 per cent of its workmen, and about 55 per cent of the whole value of its industrial products fell to the share of the towns; nor during these five years has there been any tendency shown towards a change in this respect.

Of the industrial centres of the country, Tammerfors merits special mention. This city, whose population in 1891 amounted to 21,333 souls, lies on the banks of a river bearing the same name, and uniting the two large lakes of Näsijärvi and Pyhäjärvi. With a view of protecting the use of the available water power, the Emperor Alexander I, already in the year 1821 granted the city certain rights and privileges, the most valuable of which proved to be the right enjoyed by all persons then or afterwards engaged in any commercial industry in the city to import free of duty all dry materials and machines necessary in their business. These privileges, which were renewed in 1856, continue in force up to the year 1905. Thanks to these circumstances, the manufacturing industries of the city were quickly and considerably developed. This is shown by the fact that in 1891 there were 223 factories and trading works, employing 5,476 hands, and producing goods to the total value of 15,327,877 marks. The water power used may be calculated at 4,000 horse power, besides which, 29 steam engines, altogether 2,257 horse power, were at work. Of the city factories, the most noteworthy are the cotton mills of Finleyson and Company already mentioned, with 2,076 workmen; a flax factory, with 1,151 workmen; a cloth factory, with 334 workmen; and the writing paper mills of J. C. Frenckel and Son, with 276 work people.

Of the 58,843 hands employed throughout the country in the year 1890, there were 11,903 women, that is, 20.2 per cent of the whole number; 5,694

minors between 15 and 18 years of age, that is, 9.7 per cent; and 2,038 children, between 12 and 15 years of age, that is, 3.5 per cent; and since that year no perceptible change in the proportion of the numbers has been made. Great differences in the proportionate employment of men, women and children are naturally to be remarked in the various industries; and it is in the thread factories that the largest number of women workers is to be found. Of 6,435, the whole number of hands employed in this industry in 1890, there were 4,061 women, that is, 63.1 per cent; 1,064 minors, that is, 16.7 per cent; and 552 children, that is, 8.6 per cent.

In connection with this it may be remarked that, according to the law which came into force on January 1, 1890, children are not allowed to work in factories longer than seven hours a day, during which time there must be not less than two intervals for rest, making up together not less than two hours; and neither young persons nor children are allowed to be engaged for night work. All children workers, who have not passed through a higher national school, are required to devote not less than twelve hours a week to class studies. The same law contains definite statutes relating to the protection of work people from accidents and illnesses during the time of work.

Of the whole number of workmen, 1,207, that is, 2 per cent, are not Finnish citizens, and it is in the glass industry that the largest number of foreigners is to be found. Of these latter, numbering in all 918, the majority is composed of Germans and Swedes, of whom there were in 1890, 170, that is, 18.5 per cent. It must not however be forgotten that not a few of the work people of foreign extraction have long been permanent and settled residents in the country.

The use of mechanical, and particularly steam power has greatly increased throughout the country. In consequence of there being no returns of the amount of power used in iron forges and engine-building works, the subjoined figures refer only to the other departments of the manufacturing industry.

Y E A R S.	NUMBER OF STEAM EN- GINES AT WORK.	HORSE POWER.	AVERAGE NUMBER OF HORSE POWER PER EACH STEAM ENGINE.	AVERAGE NUMBER OF WORKMEN PER HORSE POWER.
1886	419	7,568	18	4.6
1887	451	8,266	18.3	4.4
1888	519	9,353	18	4.2
1889	609	10,383	17	4.3
1890	698	12,017	17.2	4.1
1891	734	14,827	20.2	3.4

The fact that the average number of work people for each machinery horse power diminishes in a sufficiently regular proportion, shows that machinery is more and more replacing manual work, so that in 1891 for each machinery horse power there were 26 per cent less work people than in 1886. The table further shows that, on the whole, the machinery power employed for industrial purposes almost doubled during the above period of six years.

In a country so rich in water and in rapids as Finland, steam power cannot of itself be the only machinery power employed in industrial production, but on the contrary, water power will play the more important part. Unfortunately, the returns relating to the use of water power are very incomplete, and it can be stated only in approximate figures. As far as can be calculated, in the year 1890, there were used 6,923 water motors, that is, approximately 44,000 horse power. That only an unimportant portion of the water power available in the country was used, is plain from the fact that, according to the calculation made by the Chief Department of Road and Water constructions in Finland, there are nearly 1,000 rapids, representing roughly about 3,000,000 horse power. It will be understood that a large number of these rapids, partly from their position, partly from their character, are quite unsuited to be applied to industrial uses.

All the mechanical motors employed with an industrial purpose may, therefore, be reckoned in round numbers to amount to 60,000 horse power, which constitutes on an average about 1 horse power for each workman, and for every 38 souls of the whole population of the country.

There does not at the present time exist any law compelling employers and their employees to form mutual aid associations, and to be members of such associations. But a considerable number of such voluntary organizations have been formed, some of which have already been in existence for many years, but most of them have been founded within a recent period; so that of 127 mutual associations which existed at the end of 1889 no less than 60, that is to say, 47 per cent, had been established within the last ten years. The number of members belonging to these mutual aid associations in the same year amounted to 16,889, of which number 14,789 had the right to receive aid in case of illness; 12,039 had the right to receive funeral grants, and 10,105 a pension for themselves, and in case of death, for their widows and children.

The revenue of these associations amounted in 1889 to a total of 400,503 marks, of which member subscriptions furnished 31 per cent, and annual contributions made by the employers formed 15.8 per cent; besides which, the interest on the accumulated capital amounted to 26 per cent, the remaining part consisting of different subscriptions and endowments. The average share of each member of the association, therefore, is 24.87 marks.

The expenses incurred by these associations for the same period amounted to 219,717 marks; being distributed over the following different outlays:

Grants in cases of illness	130,607 marks, that is, 59.5 per cent.
Grants for funerals	7,254 » » 3.3 »
Pensions	54,991 » » 25.0 »
Administrative expenses	6,907 » » 3.1 »
Extra expenses	19,958 » » 9.1 »

The grants that were made amounted, therefore, altogether to 192,853 marks, that is, 87.8 per cent of all the expenses and outlays.

The average expenses for each member amounted to 13.65 marks, of which the grants made in cases of illness amounted to 8.11 marks. Pensions were on an aver-

age enjoyed by 4.9 per cent of all the members of the pension fund, the average amount of the pension being 104.55 marks. The means at the disposal of these associations at the end of 1889 formed a total sum of 2,278,629 marks; that is to say, the average sum for each association amounted to 21,234 marks; and for each individual member, to 124.46 marks.

METALLURGIC INDUSTRY AND METAL PRODUCTIONS.

The soil of Finland consists of mountainous beds, dating from the very earliest of the geological periods, the archaic formation. All the subsequent formations are wanting, up to the most recent, the glacial period, the layers of which, consisting of stone, clay, sand and turf moss, cover the solid mountainous base. From the compact mountainous beds, and also from the earth strata, the country obtains the raw materials for its metallic products. The mountains, however, are in general poor in minerals, which moreover are for the most part impure, and are never found in large masses. In consequence of this, metallurgy has never reached a high stage of development. The following metals are found in the country.

Gold: In 1868, alluvial deposits of gold were discovered in Lapland, in the channel of the river Ivalojoki that flows into lake Enare, and from the year 1870, gold washing has been carried on in that place. Gold has also been found in other northern localities, but in such small quantities that any thing like gold digging has been out of the question. The largest quantity of gold was found in 1871 in the Lapland mines, namely 56,692 grams; the smallest in 1886, were only 4,761 grams were found.

The finds for the succeeding years were as follows:

	Year 1887	1888	1889	1890
Grams	6,750	13,525	22,864	17,840

During the twenty-one years that these mines have been worked, 361 kilograms have been extracted, to the value of 1,160,000 marks.

Silver: This metal is found in very small quantities. It had long been known that in certain places silver existed in galena, and for a short while the silver veins were worked, but the returns proved so slight that further operations were soon suspended. At the present time, silver is extracted only in the form of an illegitimate product, during copper smelting operations at Pitkaranta, where the following quantities of silver have been obtained:

	Year 1884	1886	1888	1890
Kilograms	467.7	470.9	424	817.6

During the last seven years, 2,248 kilograms have been extracted, to the value of 688,000 marks.

Copper: Copper mines are to be met with in many parts of the country, but in consequence of their poorness, the greater number of the mines, after having been worked for a short while, have been abandoned. In the second half of the present cen-

ture only two mines, one at Orijärvi, and the other at Pitkäranta, have been worked. The copper finds, which were never of any great importance, gradually lessened from 1860 to 1870, so that the quantity of ore extracted in 1862 amounted to 174.7 tons; in 1866, to 40.5 tons; and in 1872, to 18.4 tons. In the beginning of 1880, digging operations at Orijärvi were suspended; and from that date only one copper smelting foundry, that at Pitkäranta, has been at work. The operations carried on at this foundry have within the last few years considerably increased. The following quantities of copper have been extracted at these works:

	Year 1884	1886	1888	1889	1890
Tons . . .	190.5	214.7	202.2	391.8	292.4

During these seven years there have been smelted, in all, 1,685.8 tons of copper, to the value of about 2,500,000 marks. The number of workmen engaged in the foundry, including the tin-smelting works, amounted last year to 682.

Tin: This metal is found only in the Pitkäranta mine, which, up to the present date, appears to be the only one in Eastern Europe, and in the whole Russian Empire, known to contain tin. As it happened with the copper product so the tin yield, which in 1862 amounted to 32.8 tons, fell in the following years so low, that in 1879 there were extracted in all not more than 2 tons of tin. In later years, the following quantities of this metal have been smelted:

	Year 1884	1886	1888	1890
Tons . . .	12.2	17	19.4	13.4

Iron: The production of iron in Finland is based to a very slight extent on its mineral ores, inasmuch as the iron mines discovered in this country have for the most part proved sufficiently poor, and besides that, generally contain an ore that is by no means rich; consequently, these mines have little by little been abandoned. How the working of these mines has for this reason fallen off may be seen from the following returns.

Y E A R.	NUMBER OF MINES WORKED.	TONS OF ORE EXTRACTED.
1858	16	6,956.7
1860	7	5,108.7
1865	9	2,237.2
1870	2	528.4
1875	1	471.3
1880	1	242.5

From the year 1875 only one mine has been worked a year, namely, the Kulonsuamäki mine, in the Newland government, where however the works were suspended in 1888; but in the following year, 1889, another mine, at Wälimäki in the Viborg government, on the banks of the Ladoga lake, was begun to be worked.

In the succeeding table are noted the yields of mineral iron ore for the last few years:

	Year 1884	1886	1888	1889	1890
Tons . . .	125.5	90	46.2	1,030	4,335

The trifling quantity of mineral iron ore to be obtained in Finland would of itself exclude the existence of iron in that country, so far as it is based on native raw materials, if Finland did not enjoy other sources for the production of iron in the shape of its lake ores, which are to be found in its numerous waters. The formation of this ore is due to a chemical process, by which the indissoluble combinations of iron that enter into the composition of the mountainous beds and soil strata, are decomposed and dissolved by the water in conjoint action with the atmospheric oxygen and carbonic acid; this solution being carried by the subterraneous springs to the beds of the rivers and lakes, where the carbonic acid is thrown off and the hydrous oxide of iron is precipitated. This ore assumes many and different forms, being sometimes in the shape of an irregular lump, and sometimes in the shape of a surface slice, that would cover a moderate-sized coin. The ore is dug out of the bed of the lakes by means of specially constructed instruments. The art of dressing lake ores was known to the pagan Finns, who were wont to smelt the iron in small forges, and convert it straight into wrought iron. In the present day lake ores are converted in ordinary blast furnaces into cast-iron. The quantity of lake ore obtained in different years is set forth in the annexed table.

Y E A R.	NUMBER OF LAKES.	TONS OF ORE.
1861	—	30,750
1870	—	50,775
1875	—	74,122
1880	—	36,902
1884	126	46,506
1885	61	29,477
1886	71	27,626
1888	132	34,813
1890	180	55,099

The falling off in the years between 1875 and 1880 is to be explained by the unsatisfactory state of the markets, and the consequent suspension of work in some of the factories belonging to Poutilov, a firm that depended exclusively on imports into the Empire. The decrease, both in the earlier period, 1884 to 1885, and later, arises from the fact that the hitherto unlimited right to import into the Empire, free from all duties, cast-iron that had been smelted from Finnish ores, was in the last year limited to the quantity of 400,000 pouds, equalling 6,557 tons per annum. Respecting bar-iron, which earlier was also allowed to be imported in any quantity into the Empire free of duty, a limitation was simultaneously made to the

effect that this same proportion of 400,000 pouds should be allowed to be imported on payment of a duty of 15 kopecks per poud. The excess from the year 1886, which during a period of five years, from 1886 to 1890, amounted to almost 100 per cent, is to be explained by the improvement that took place in the general economic state of the country, and the consequent increase in the demand for iron.

Lake ore is chiefly to be found in the eastern parts of the country. The work of digging the ore out of the lakes, and conveying it to the foundries, is chiefly undertaken and performed by the inhabitants of the villages in the neighbourhood of the foundries, and it forms by no means their least important source of livelihood.

In the same way, as the principal business of the iron forges of eastern Finland, which are situated in the interior of the country, is to dress the lake ore, the iron works of the south-western parts of the country mainly occupy themselves with the mineral ore imported from Sweden, a richer metal than the native ore, and moreover dug up with difficulty. Thus, in the year 1890 no less than 16,214 tons of Swedish ore were prepared and dressed in these foundries.

The amount of pig iron smelted in the different years is shown in the following table.

Y E A R S.	TONS OF SMELTED PIG IRON.	TONS OF PIG IRON PRODUCED FROM LAKE ORE IN EASTERN FINLAND.
1852	6,205.0	—
1872	19,422.5	—
1876	26,093.1	—
1878	14,397.4	—
1885	23,914.8	13,304
1886	17,383.6	7,189.7
1888	19,684.9	11,308.8
1890	23,749.5	15,398.7

The causes of the decline in the produce for the years 1878 and 1886 have been already explained.

As has already been shown, a large quantity of pig iron is sent into Russia, but at the same time it is brought into the country from abroad. The following table shows the relative proportions of pig iron exports into Russia, and imports into Finland:

	Year 1884	1885	1886	1888	1890
Sent into Russia	4,366.7	4,555.7	4,444.5	5,558.9	6,418.1
Imported into Finland	20,918.4	10,862.5	4,662.9	3,998.6	8,345.4

The decrease in the imports for 1885 and 1886 is to be explained by the change which, as already mentioned, was made as to the export of bar iron. The pig iron imported into the country is used for two purposes. Swedish pig iron is used

in the iron works of south-western Finland for the production of bar iron. English pig iron is used in large quantities in the smelting foundries and in the engine-building works.

An idea of the amount of bar iron, fine merchant iron and sheet iron, that is dressed and prepared, may be formed from the subjoined figures:

	Year 1885	1886	1888	1890
Tons	17,387.4	9,994.0	10,134.7	15,226.5
Of these tons, in forges	5,074.0	3,521.3	3,372.4	4,346.7

The greater part of this product consists of bar iron, and its different kinds; a small portion consists of sheet iron, which is prepared in three rolling mills. In the year 1890, there were prepared 8,649.4 tons of puddling iron, and 2,333.7 tons of Martin iron.

To give an idea how far the production of iron is on a level with the local wants of the country, the following figures give, for several years, the exports and imports of bar iron, sorted iron, fine merchant iron, and sheet iron.

	Year 1885	1886	1888	1890
Tons exported into Russia . .	18,883.5	6,223.1	4,435.8	5,796.4
Tons imported from Russia . .	3,324.5	4,744.7	8,929.9	14,693.5

Sheet iron forms a very considerable part of the imported iron, and in 1890, 4,813 tons of it were imported. The great increase in the quantity imported the last few years, it seems, is chiefly to be explained by the increased demand, for building and construction purposes, of a kind of sorted and special iron that is not prepared at home.

The general value of the gross product in this section is to be seen from the subjoined figures:

	Year 1885	1886	1889	1890
Marks	9,427,290	7,538,632	6,146,825	9,539,920.

ENGINE BUILDING AND OTHER METAL INDUSTRIES.

The condition and state of engine-building works and smelting foundries in Finland in earlier years may be gathered from the following figures:

	Year 1858	1866	1870	1876
Number of works and foundries	9	14	13	15

Value of work turned out (marks) 630,000 1,320,000 3,210,000 5,700,000.

During the last few years the value of work executed amounted to the following sums:

	Year 1885	1886	1888	1890
Value of work turned out (marks)	5,968,283	4,276,968	6,902,555	10,882,560.

Many of the workshops in Finland serve also as shipwright yards, and consequently in the latest returns no difference can be made between ship building and

the special work executed in these workshops. In former days, when wooden sailing vessels were exclusively, or at any rate principally used for conveyance of freight, ship building was carried on to a very large extent in many localities in Finland, in consequence of navigation both on home and on foreign waters being so widely spread. The people of East Bothnia are, up to the present day, famous for their skill in ship building and in carpentry. Since iron ships have more and more replaced the old wooden vessels, most of these wharves have closed operations, and now wooden ships are almost exclusively built in village colonies for coasting navigation, along the Baltic Sea, or the gulfs of Finland and Bothnia. Such work is only casual, and therefore wharves of this class have a more or less temporary character.

To give an approximate idea of the extent of the work executed in these mechanical factories and workshops, it may be stated that, in 1890, there were amongst other works built in them, 28 steamers, altogether of 2,759 actual horse power; 32 transportable steam engines; 16 water pressure, and 74 land engines; in all of 3,274 actual horse power; 81 steam boilers; 4,541 agricultural machines and implements; 14 saw-mill engines; and 35 mill apparatus. The most extensive of these works is the firm of Crichton and Company at Abo, which in 1890 employed 671 workmen and turned out work to the value of 1,926,864 marks.

Besides private workshops there are also Government mechanical works, which execute very large orders, and were founded to supply the Government railroads. The following figures show the value of work executed in these Government railroad workshops:

	Year 1884	1886	1888	1890
Value in marks	892,223	1,115,194	1,124,910	1,700,619

In 1890 about 600 workmen were employed in these workshops. The further development of this industry depends upon the extension of the railway system, and increased traffic on the lines.

The engine-building industry in Finland far from corresponds with the wants of the country, and in spite of the rapid progress it has made within the last few years, is not on a level with the growing demand; and consequently, there has been a simultaneous increase in machinery imports. The following table has been drawn up for the sake of bringing out the corresponding proportion between the imports and exports of engines, machine apparatus and implements:

	Year 1885	1886	1888	1890
Value of imports in marks	2,772,739	2,043,554	4,191,558	6,125,578
Value of exports in marks	422,592	148,590	154,113	394,664

The nail industry has made great progress, owing to the comparatively high duty laid in the 1886 tariff, as will be seen from the annexed figures:

	Year 1885.	1886.	1888.	1890.
Tons of nails manufactured . . .	1,409.500	989	1,970.2	3,257

But this amount by no means satisfies the local demand, and in 1890 there were imported into the country 593.8 tons of nails, to the value of 274,732 marks,

the export of nails in the same year amounting to 138.7 tons, to the value of 52,721 marks.

Of other workshops in connection with metallic industries must be mentioned the following: blacksmith forges and locksmith works, of which in 1890 there were 436, employing 1,013 work people, and executing work to the value of 1,090,145 marks; 80 gold and silver workshops, employing 268 work people, and executing orders to the value of 143,046 marks; 80 tin and sheet metal workshops, employing 411 work people, and executing work to the value of 684,485 marks; 81 copper workshops, employing 271 work people, and executing work to the value of 342,609 marks; 108 clock and watch workshops for setting up and repairing clocks ordered from abroad, employing 256 work people, and executing work to the value of 330,438 marks; and also one galvanic workshop, employing 33 work people, and executing work to the value of 174,000 marks. Altogether, in 1890, there were 864 workshops in connection with this branch of industry, employing 2,623 work people, and executing work to the value of 3,674,934 marks.

TEXTILE FACTORIES AND THE CLOTH INDUSTRY.

As far as the value of products is concerned, the textile fabrics come immediately after the forest materials and foodstuffs.

The first place among these is occupied by cotton factories. As the proportion of cotton imported from America and East India for use in the factories of Finland appears to be the surest standard of the development of this branch of industry, the following table has been drawn up to show the amount of raw material imported in different years:

Year.	1666.	1870.	1875.	1880.	1885.	1891.
Tons . . .	933.4	1,389.2	2,341.4	2,975.1	2,629	4,118.2

The rapid increase in the amount of these imports during the later years, from 1886 to 1891, is shown in the subjoined table:

	Year. 1886.	1888.	1890.	Increase in five years.	1891.
Number of work- men.	3,170	3,709	4,231	33 per cent.	4,266
Value of products in marks . . .	10,294,670	11,994,205	14,517,926	41 » »	14,915,934

This increase was chiefly the result of enlarged operations in the four factories that exist up to the present time, and besides which only one small factory has been opened during all this period. The largest of these cotton mills appears to be the one belonging to the firm of Finleyson and Company, of which mention has been made above, and that belonging to the joint-stock company, Forssa, which has also been already spoken of. The former of these two factories, during the years 1891 and 1892, opened a new spinning mill, in which a steam loom was put up, of 850 actual horse power, being by considerable the largest loom at work in the whole country.

The home production of cotton fabrics is not sufficient to supply local demands. The exportation of these goods for sale is restricted to the Russian Empire, the duty being at the rate of 70 kopecks per poud, to only 50,000 pouds, equal to 820,000 kilograms to be exported per annum; nor does the export of cotton fabrics ever exceed this normal figure.

The import of cotton fabrics for earlier years cannot be accurately stated, since in all the returns of imports from different parts of the Russian empire, thread and cotton fabrics of different kinds, cotton, flax and wool, are given promiscuously, since the different sorts were allowed to pass free of duty. In 1891, the value of imported cotton fabrics amounted to 5,591,308 marks, of which 3,468,495 marks formed the value of the imports from Russia, whilst these fabrics were exported to Russia to the value of 2,734,112 marks.

The woollen factories have during the last few years begun to occupy a more prominent place among the industrial establishments of the country. These factories carry out operations of two kinds. On the one hand, materials, sent for that purpose, are finished and made up; as for example, wool-spinning, the preparation of different materials and the dyeing and dressing of hand-work materials, as fulling, pressing, et cetera. These frequently form the principal operations of small mills and factories, and at the same time, are of more or less importance even in the largest mills. The other class of operations consists in the preparation of thread and materials upon the initiative of the factories themselves, for which kind of production foreign wool is principally used, since home-grown wool is generally too rough and short for the fabrication of fine goods. The import of wool, therefore, appears to be the most convenient standard of the activity of the factories in the preparation of woollen fabrics; and the following figures show the amount of imported wool:

	Year 1866.	1870.	1880.	1886.	1888.	1891.
Quantity imported in kilograms . . .	19,250	80,045	101,023	200,430	242,511	471,374

The following table is annexed for the sake of showing the state of the woollen industry during the last few years:

WOOLLEN INDUSTRY.	1886.	1888.	1890.	INCREASE IN FIVE YEARS.	1891.
Number of mills.	12	12	16	33 per cent	17
" " workmen.	555	570	829	49 " "	933
Value of products in marks. . . .	1,524,735	1,906,860	3,093,269	103 " »	3,480,264

The export of woollen fabrics is very trifling. But on the other hand, woollen yarn was imported in 1891 to the value of 176,940 marks, and woollen materials to the sum of 7,095,613 marks, of which 2,379,559 marks form the value of goods imported from Russia. The local demand, therefore, presents a wide field for the future development of this industry.

There is in the whole of Finland but one flax mill, namely at Tammerfors. The production of native flax is not, however, sufficient to supply the quantity of the raw material required by the above-mentioned factory, after having supplied the demand for the home-weaving industry. Consequently, during the last few years, the factory has employed only four per cent of home-grown flax, and sixty per cent of Russian flax. The following figures show the quantity of Russian flax, as well as of hemp and combings, imported during the last years:

Year 1882.	1886.	1888.	1890.	1891.
Tons . . . 941	945	1,257	1,121	1,203

The operations of the flax mill have considerably increased during the last few years, as is evident from the following figures.

FLAX INDUSTRY.	1886.	1888.	1890.	INCREASE IN FIVE YEARS.	1891.
Number of workmen.	984	979	1,070	8 per cent	1,151
Value of products in marks . .	2,200,000	2,400,000	2,900,601	32 " »	3,020,000

A considerable portion of the products of this factory is designed for exportation to Russia. The value of the exports to Russia for 1891, according to the returns that have been made, may be calculated at above 2,000,000 marks. In this same year, yarn was imported to the value of 454,015 marks, of which 423,627 marks represent the value of yarn imported from Russia, and flax materials to the value of 617,453 marks, of which 205,947 marks represent the value of the imports from Russia.

The knitting industry was represented in 1891 by 5 factories, employing 223 workmen, and executing work to the value of 658,409 marks.

Besides the above-mentioned manufacturing industries, the preparation of textile stuffs forms a widely spread home occupation among the peasantry. The chief object of this village handwork industry is to supply the necessities of the household, and at the same time, to a small extent, to provide articles for general sale. This industry is in some places followed and practised in a more regular and settled manner, and merchants or companies furnish the weavers with yarn and patterns, and buy the woven goods of them for subsequent sale. Of these hand-woven goods, cotton stuffs prepared in the suburbs of the cities Borga and Joensuu, cloth and knitted stuffs prepared at Nystad, flaxen and twilled stuffs prepared to the south of Oesterbotten, and horse hair rugs prepared at Borga and Uleåborg, are well reputed and much valued. It is impossible to give even approximately any calculation as to the extent of this house industry, but there can be no doubt that it has greatly increased within the last few years. The interest with which peasant women throughout the country learn hand weaving, and the eagerness with which they attend the schools that have lately been established for giving instruction in weaving, may be cited as a proof of the progress it is making. Nearly all these schools have been founded by private individuals or benevolent societies, but in virtue of a long existing

general law, they also receive a subvention from the Government, which exercises a certain control over their direction and administration. The following table gives the number of these schools for different years, as well as the amount of the subvention they receive:

	Years 1890.	1891.	1892.
Number of schools	11	20	25
Amount of Government subvention in marks	17,300	22,400	28,500

The number of tailoring establishments in towns amounted in 1891 to 318, employing 1,520 workmen, and executing work to the value of 3,039,764 marks. Ready clothes were imported in the same year to the value of 2,185,081 marks, of which 1,155,899 marks represent the value of the imports from Russia.

These were in 1891 only two hat manufactories in the whole country, employing 112 workmen, and executing work to the value of 502,747 marks. In the 14 city trading establishments for preparing hats and caps, 65 workmen were employed, and the value of all goods prepared amounted to 69,903 marks. In the same year caps to the value of 229,773, of which from Russia to the value of 192,479 marks, were imported; and hats, to the value of 344,587 marks, of which were from Russia, to the value of 170,666 marks.

It must be remarked that a large number of caps and hats are also prepared in villages by home hand work. Winter sheepskin caps, more than any other kind, are prepared in this way. Villages also occupy themselves with making straw hats; and during the last few years measures have been taken to encourage this industry. Among such measures may be cited the establishment at Borga of a special school for instruction in making straw hats.

TIMBER INDUSTRY.

Forest products constitute nearly one-half of the value of Finnish exports. From this fact alone may be judged the peculiar importance of the place which wood and timber products, the chief of all its articles of commercial interchange, must hold in the industrial life of the country.

Saw mills occupy the first and principal place among these industries. Timber sawing has, during the second half of the present century, passed through several phases, the latest of which must be referred to the last five years. Up to about the year 1860, so long as scarcely any but water saw mills were at work, mills were necessarily constructed only in places where water power was most easily attainable. The timber-sawing industry was, therefore, at this time confined to a number of small mills in the interior of the country; the peasants, at the same time, sawing by hand a considerable number of beams for sale. When, between the years 1860 and 1870, the timber trade became much brisker, this mode of conducting it had to be changed, inasmuch as the transport of a large quantity of sawn timber over ground roads became difficult and involved too great a cost. The use of steam power rendered a change in this respect possible. Only within the boundaries of the Saima water basin, which offers excellent lake communication between the wide

tract of the interior provinces of the country and the seashore, was the old-fashioned mode of carrying on the timber industry continued. During this period large steam saw mills were erected in other parts of the country, along the low current of streams suitable for floating timber, and large capitals were often expended on their construction. The timber was often floated down from forests that lay at a great distance from these saw mills. This mode of carrying on the timber industry was the result of the geographical character of the country, since its numerous river systems opened up a cheap and natural way of timber transport.

But this mode of transport had one great inconvenience. Finland, with the exception of East Bothnia, has no long continuous rivers, and its waters take rather the shape of lakes, united one to another by streams of various length. Along these streams the timber beams are floated one by one, whereas in passing through the lakes they have to be bound together in rafts. The constantly recurring necessity of binding and unbinding the rafts greatly delays the delivery of the beams at their place of destination. Indeed, to float timber any very great distance takes more than one summer. When, towards the end of the eighties, the timber market, which had been depressed for a considerable period, began to improve, the instability of favourable conditions was borne in upon the mill owners by dearly bought and costly experience. It was, therefore, necessary to seize the opportune moment, and this was impossible under the then existing system of long floatings extending over more than one summer. The extension of the railroad system, about the same time, also contributed to bring about a change in the timber-sawing industry. The development of this industry within a recent period brought with it the establishment of a number of small steam saw mills, most of which did not continue their operations for any long time, near railroads and the water lines of communication, and in this way considerably circumscribed the sphere of its activity. At the same time, timber hand-sawing declined more and more each year.

The extent to which the Finnish timber industry has been developed within the last few years may be learned from the annexed table.

TIMBER TRADE.	1886.	1888.	1890.	INCREASE IN FIVE YEARS.	1891.
Number of saw-mills.	245	253	341	39 per cent	355
„ „ workmen.	7,369	8,024	10,578	43 „ „	10,225
„ „ posts sawn.	221,266	243,885	312,506	41 „ „	319,530
Value in marks of work executed.	23,393,375	27,142,389	33,911,429	45 „ „	33,256,697

The decrease in value of work executed in 1891 was caused, as is to be seen, from the amount of production, by the fall of prices in the timber markets. Of the saw-mills at work in 1890, 166 were water mills, and 174 were worked by steam with 191 steam engines, in all of 4,505 horse power. The number of saw mills had, since 1886, been increased by 96 new ones, of which 27 were water, and 68 were steam mills. Of these, 78 are newly built; the others being old saw mills, mostly worked by water, which for a while suspended operations, but have now resumed work.

The question, whether the rapid development of the timber-sawing industry is balanced by the natural growth of the forests of the country, has not yet been unconditionally solved. There is no doubt that a like correspondence is not to be observed everywhere, but that on the contrary an excessive clearance of forests is to be remarked in many places. It is a well-known fact, supported by statistical returns, that the timber-sawing industry has begun of late to clear forests on a smaller scale than before. And thus, in 1891, there were sawn 11,641,294 beams, which leaves nearly 37 beams per standard, whilst the number of beams in 1886 amounted to only 6,949,415, leaving 31 per standard.

The central points of the Finnish timber-sawing industry are Björneborg at the mouth of the river Kumo, and Kotka, situated at the point where the river Kymmene falls into the sea. In both these towns up to two million beams are sawn a year, much of the timber being floated along these rivers from the interior of the country.

The number of workmen as given in the above table by no means includes all who gain their living by the timber-sawing industry. A large number of work-people, chiefly inhabitants of the villages around, find occupation in felling and carting the timber, and floating it down the rivers and across the lakes. It is, therefore, easy to understand that a slightly better or worse state of the timber market, with a consequently greater or smaller demand for timber, exercises on the well-being of the population the same kind of influence as a good or bad harvest.

Notwithstanding the important bearing which forest industries, and in particular the timber-sawing industry, have in the country, the higher branches of the industry are but little cultivated or practised. Although a portion of the sawn material is exported already planed, the export of timber in other more finished forms is very small.

The extent to which joinery has been developed may be seen from the following table.

J O I N E R Y.	1886.	1888.	1890.	INCREASE IN FIVE YEARS.	1891.
Number of joinery workshops. .	165	187	218	32 per cent	223
» » work people	806	919	1,318	63 » »	1,432
Value of products in marks. . .	1,223,670	1,247,065	2,118,115	73 » »	2,331,239

The rapid development of steam-joinery workshops is particularly remarkable. In 1887 there were but six, employing 284 workmen, and executing work to the value of 656,205 marks, whilst in 1891 there were already 13, employing 635 workmen, and executing work to the value of 1,567,084 marks. This increased activity is mainly to be attributed to a chance circumstance, namely, a temporary increased briskness in the building trade. But in general, the joinery industry is not adequate to the wants of the country. This is to be seen from the fact that in 1891 there were imported articles of the joinery and cabinet-making industries to the value of 539,989 marks, of which 337,420 marks represent the value of imports from Russia,

whilst exports valued only 117,168 marks, of which goods to the value of 113,844 marks were exported to Russia.

As will be seen from the following table, the manufacture of reels and bobbins has only within the last few years begun to be of any importance.

J O I N E R Y.	1886.	1888.	1889.	1890.
Number of factories	1	2	2	3
» » workmen	49	148	222	349
Value of products in marks . .	90,200	276,000	536,000	602,600

All the products of this industry are intended for export.

CHEMICAL INDUSTRIES.

Of all the branches of Finnish trade, the chemical industries without doubt appear to be least developed, especially if one compares their condition with the stage they have reached in other countries.

As an article of export, dry distilled pitch occupies the first place among products obtained by chemical appliances. Subjoined is a table of the exports of this article.

CHEMICALS.	1886.	1870.	1880.	1886.	1888.	1891.
Amount of hectolitres . .	242,557	171,680	159,785	113,024	144,622	143,504
Value in marks	—	—	—	1,619,762	1,446,220	2,019,056

Pitch is for the most part a product of village home industry, and at the present time is chiefly produced in the northern parts of the country. For a very long time the distillation of pitch has been an accessory occupation of great importance, and sometimes has been the sole means of making money. It is for the most part in exactly the same stage of incomplete development that it was in days long gone by. Pitch is nearly always distilled in so-called pitch pits, that is, funnel-shaped cavities composed of planked partition walls, covered on the inside with clay and generally made on the declivity of a hill in such a fashion that the pit rests, on one side on the hill, and is propped up on the other side by beams. At the bottom there is an aperture having communication with a drain pipe, through which the pitch flows. The resin is stowed in the pit in the thickest possible layers, and covered with brushwood and earth, so that the distillation may be effected without exposure to the air from without. The resin is chiefly exuded from forest

sapplings, the bark of which is previously stowed away for two or three years to accelerate the formation of the pitch.

Within the last few years, measures have been adopted by the Government to familiarize the population with more rational and scientific modes of pitch distilling, involving less destruction to the forests. But it is not likely that any real change will soon be effected. There is no doubt that a considerable number of distillatory vessels are already at work in the country, but there is no positive information as to the results of their introduction into Finland.

Only pitch is utilized in distilling operations in the so-called pitch pits, all other products formed during the operation of distilling, such as wood spirit, pyroxylic acid, et cetera, being quite lost. The latter, however, are collected in the new distillatory vessels, and for their further preparation in forms fit for sale, a factory was established at Uleaborg, which however did not commence to work till 1891.

Among the products of the chemical group the most valuable are soap, and other chemical preparations. This is shown by the following table.

C H E M I C A L S.	1886.	1888.	1890.	1891.
Number of factories	9	11	11	14
» » workmen	36	57	59	78
Value of products in marks. . .	342,065	482,275	792,872	869,253

Of these industries soap boiling is placed on by far the best footing. In the returns for 1891 are to be found 5 soap-boiling works, employing 46 workmen, and turning out goods to the value of 748,033 marks. The products are almost solely for home use, and the value of the soap exports did not amount to more than 5,400 marks, whilst the value of soap imports amounted to 145,172 marks.

The candle industry, which formerly flourished to a considerable extent, now scarcely exists at all in the country. In 1875, the principal candle factory was the one at Havis, which turned out 239,887 kilograms of stearine candles, 104,308 kilograms of palmatine, and 14,195 kilograms of tallow candles. But even then the trade was by no means on the footing it should have occupied. The general value of candle and soap-boiling products in 1886 was rated at 1,310,000 marks; in 1870, at 1,640,000 marks; and in 1876, at only 97,000 marks. In 1891, 450,785 kilograms, of candles were imported, almost exclusively from Russia, to the value of 665,069 marks.

Another of these chemical industries, the manufacture of matches, has also exhibited signs of decline. In former times matches formed a considerable article of export. The first of the then existing factories in the country, at Björneborg, was one of the largest of its kind in all Europe. The Björneborg matches were then in use in all parts of Finland, in Europe and in other countries. So late as 1870, no less than 40,160 cases of matches, each case containing 1,000 boxes, were exported;

but before 1875 the demand for them had decreased to 7,614 cases; and subsequently the export ceased altogether: so that now matches are manufactured solely for home use. Inasmuch as matches are not brought from abroad, no great change can be expected to take place in this particular industry. In 1891, there were in the whole country 14 factories, employing 594 work people, and manufacturing matches to the value of 582,269 marks.

Bone-turning mills, many of which have been opened on a modest scale in the form of a village house industry, are not characterized by any large turn-out of products, but deserve to be noticed, inasmuch as they are continually increasing in production, as will be seen from the following table.

BONE INDUSTRY.	1886.	1888.	1890.
Number of mills.	18	15	16
» » workmen.	64	114	101
Value in marks of products . .	136,350	255,265	368,516

From these figures there is also reason to suppose that this particular industry has a tendency to pass over from a house to a factory industry. The import of bone-dust, almost exclusively from Russia, in the year 1891, amounted to 825,030 kilograms, to the value of 99,030 marks; but there were no exports.

In the year 1891, there were 133 independent dyeing works, employing 286 workmen, and executing work to the value of 500,392 marks.

POTTERY AND STONE-CUTTING INDUSTRIES.

Owing to Finland being so rich in rock formations, its native stone, which mainly consists of granite, notwithstanding the difficulty with which it is worked, has long been generally made use of in the building industry. Thus, outside the country, and particularly in the capital city of the Empire, Finnish granite is often used as a building material. The quays of the Neva are constructed of this stone, which was almost exclusively brought over from the Pytterlaks granite quarries; and the Alexander Column, as well as the pillars in the cathedral of St. Isaac, at St. Petersburg, are famous instances of the use of this material. Another species of Finnish stone, the Ruskeala marble, is to be met with at St. Petersburg, both in the cathedral of St. Isaac and in the Marble Palace. For the last few years these quarries have ceased to be worked.

In general, the stone-cutting and polishing industries no longer occupy the independent position they held in former years; and it is only within a very recent period that a revival of this branch of industry is to be remarked. In the year 1891, about 560 workmen were engaged in it, and the value of work executed amounted to a little more than 600,000 marks. To what an extent this increased activity depended

on exports, is seen from the fact that in this same year unwrought stone was exported in the following proportions: granite and feldspar, to the value of 165,114 marks, hewn stone for paving and other kinds of wrought stone to the value of 164,503 marks; these exports being almost exclusively to Russia.

From the following table may be seen the amount of business done in the Finnish brick kilns.

BRICK TRADE.	1886.	1888.	1890.	1891.
Number of kilns.	83	87	96	120
» » workmen.	1,658	1,948	2,788	2,754
Value of products in marks . .	996,350	1,240,660	2,058,982	1,934,283

The brick industry is carried on solely with a view of supplying the home demand.

The annexed table will show the progress that has been made in the Dutch-tile, earthenware, and porcelain industries.

CERAMICS.	1866.	1876.	1885.	1886.	1888.	1890.	1891.
Number of factories . .	14	16	9	8	10	9	10
» » workmen. .	—	—	483	449	590	607	619
Value of products in marks	270,000	780,000	1,097,715	964,410	1,158,165	1,404,817	1,430,661

The decrease in these industries from 1885 to 1886 is explained by the cessation of exports into Russia; whereas the exports of 1884 amounted to 714,611 kilograms, and in 1885 to 624,693 kilograms, they fell in 1886 down to 444,144 kilograms, and from that date have remained on the same level, or a little lower. The exports fell in consequence of a duty of 30 kopecks per poud being laid on all earthenware goods exported into Russia, they having been up to that time free of duty.

The value of goods exported into Russia by these factories in 1891 amounted altogether to the sum of 263,461 marks; namely, Dutch tiles to the sum of 121,470 marks, and earthenware and porcelain goods to the sum of 141,911 marks. This branch of industry, consequently, had chiefly in view the supply of home markets; for which, however, it proved inadequate, since in the same year earthenware and porcelain goods were brought into the country to the value of 470,983 marks, of which sum 230,772 marks represent the value of goods imported from Russia.

The glass industry has also during the last few years suffered a temporary stagnation, and for the same reasons. Since 1886, only bottles can be exported from Finland into Russia free of duty, all other glass products being subject to a duty of 30 kopecks per poud. The following figures show the fluctuations in this industry.

Y E A R.	NUMBER OF FACTO- RIES.	NUMBER OF WORK- PEOPLE.	VALUE IN MARKS.
1866	18	—	490,000
1876	13	—	780,000
1885	18	653	1,503,820
1886	15	666	1,291,280
1888	13	595	1,458,235
1890	15	918	1,958,955
1891	14	847	2,042,551

Thus, the value of exports in 1885 amounted to 1,021,570 marks, and in 1886 had already fallen to 714,024 marks, and though the exports in later years have risen, the increase has been restricted to the export of bottles.

As has been seen from the last table, the glass industry in Finland is intended for foreign trade; and, in 1891, there were exported, almost exclusively to Russia, bottles to the value of 974,269 marks, window glass to the value of 341,485 marks, and other kinds of glass to the value of 23,010 marks, amounting altogether to 1,338,714 marks. In the same year, glass goods were imported to the value of 774,927 marks, of which 201,308 marks represent the value of goods imported from Russia.

FOODSTUFFS.

Finland is so rich in running streams, and in rapids formed by them, that there has been no difficulty in setting up, at comparatively short distances one from another, water flourmills, each designed to supply a particular district of very small extent. In these mills, which are generally very primitive in their construction, grain is ground for the neighbouring peasantry. Besides these, a small number of steam flourmills has been erected within the last few years in some of the villages.

The grain produce of Finland is in no way adequate to satisfy the home demand. The imported grain comes for the most part from Russia in the shape of flour. In eastern Bothnia, and in the south-western parts of Finland, the grain produce, on the contrary, is in excess of the local demand, and this excess, mostly oats but also rye, is exported in an unground form, since Finnish grain, after it has been well dried in a cornkiln, is in great demand for sowing purposes. The position, therefore, which the Finnish grain trade occupies, sufficiently explains the reason why there is so little need of trading flourmills conducted exclusively on independent commercial principles. In the whole country there do not exist at the present date more than ten trading flourmills, the value of whose products in 1891 amounted to about 4,000,000 marks. The largest of them, apparently, is the Wassa steam flourmill, furnished with five steam engines, in all of 580 horse power, and whose products in 1891 were valued at 1,401,370 marks.

In 1890, there were 1,383 trading and village mills at work in Finland, with a staff of 1,752 workmen. Of these mills 1,288 were worked by water.

Two sugar-refining mills have for a long time been at work in Finland, the products of which are based exclusively on imported raw sugar. As experience has

proved, it is not sufficiently profitable to cultivate beet in this country. The products of the two mills vary from year to year in quantity, but at the present moment a sufficiently marked increase is to be noticed in them, as the following figures show.

	Years. 1866.	1871.	1886.	1890.	1891.
Number of work people. .	—	—	188	231	240
Value of products in marks	3,690,000.	5,270,000.	3,530,375.	6,019,350.	7,853,499.

An increase so marked in these products cannot be explained solely by an increase in their consumption, but must be accounted for by the decrease in imported refined sugar, and this is made clear by the subjoined figures.

	Years. 1886.	1888.	1890.	1891.
Quantity of imported refined sugar in tons	5,887.	7,536.	7,514.	6,466.

But, inasmuch as the change in the amount of imports far from corresponds with the change in the amount of products, there is reason to suppose that the consumption of sugar in the country must have materially increased.

According to the actual law, the distillation of brandy from cereals in Finland is only permitted when carried on under the strict control of the authorities, and on payment of a duty of 65 pennies on each litre of brandy containing 50 per cent of alcohol. The law is mainly directed against drunkenness, to diminish which a number of measures have during the last few years been adopted, partly by limiting the right to trade in spirituous liquors, and partly by raising the duty on the distillation of brandy. These measures have necessarily had an influence on the brandy-distilling industry. In the following table the amount of brandy distilled in Finland is set forth.

B R A N D Y.	1886.	1888.	1890.	1891.
Number of distilleries	64	32	45	44
Quantity distilled, in litres . . .	11,282,000	4,043,000	7,860,000	7,498,000
Number of workmen	1,109	457	709	727

Although the distillation of brandy has thus constantly increased from its lowest level in 1888, which is to be explained by the increasing demand on the part of the population, it has never attained its former proportions.

An essentially different state of things is perceived in the returns from Finnish beer and porter breweries.

BEER AND PORTER.	1886.	1888.	1890.	1891.
Number of breweries	83	84	89	89
Number of workmen	954	1,110	1,306	1,411
Quantity brewed, in litres . . .	12,804,000	17,945,000	20,448,000	24,932,000

The consumption of beer is thus seen to have regularly and constantly increased.

The same increase is to be noticed in the tobacco industry of the country as is shown in the following table.

T O B A C C O.	1886.	1888.	1890.	1891.
Number of factories	29	31	28	32
Number of workmen	1,179	1,417	1,713	1,837
Value of products in marks . .	3,834,295	4,424,585	5,145,177	5,790,517

THE LEATHER INDUSTRY.

Skin dressing occupies an important place among the trades of Finland. With respect to this industry, it is necessary to speak first of the tanneries. The following table shows their number and the extent of their operations.

L E A T H E R.	1886.	1888.	1890.	INCREASE IN FIVE YEARS.	1891.
Number of tanneries . .	485	602	588	21 per cent.	615
Number of workmen. . .	1,530	1,903	1,977	29 »	2,035
Value of products in marks	7,052,360	8,258,735	9,875,283	40 »	9,965,807

Properly speaking, three of the above mentioned tanneries, employing 325 workmen and executing work to the value of 3,251,800 marks, may be regarded as factories, whilst the remainder bear rather the character of trade stores. The largest and most important of the former is the sole leather factory at Uleaborg, belonging to Brothers Astrom. In 1891 there were 253 workmen employed in the factory, and the value of goods prepared amounted to 2,821,800 marks. Nearly all the raw hides required by the factory are imported, Brazilian hides being principally used, as well as large number of Russian skins. The import of hides will, therefore, to a certain extent, determine the condition of the leather industry. In the following table the number of tons imported is given for different years.

	Years 1867.	1870.	1880.	1886.	1888.	1890.	1891.
Tons imported	65	169	612	800	1,831	3,220	3,447.

A large quantity of tanned leather is sent to Russia. In 1891, the value of these exports amounted to 1,838,470 marks; whilst the imports amounted to only 638,367 marks, of which 424,904 marks represent the value of the imports from Russia.

The actual condition of the harness industry is explained by the following figures, which, however, it must be remembered, refer only to towns, since there are no returns from the villages.

S A D L E R I E S.	1886.	1888.	1890.	1891.
Number of harness factories . .	79	85	85	81
» » work people	185	241	550	495
Value of products in marks . .	278,990	399,750	1,069,097	904,799

The sudden increase, as shown in the above return for 1890, is explained by the fact that in that year large stirrup and saddle leather works were opened at Uleåborg by Bröder Äström. In 1890 there were employed in these works 333 work people, and the value of the work executed amounted to 708,000 marks. In consequence of the bad state of the trade throughout the country, the staff of workmen was reduced to 235 in the year 1891, and the value of work executed fell to 607,500 marks. The export of harness articles is extremely insignificant; whilst the imports for 1891, mostly from Russia, amounted in value to 174,620 marks.

There were in 1891, in different towns of Finland, 524 boot and shoe factories, employing 1,344 work people, and turning out goods to the value of 1,496,327 marks. In the same year, shoe leather was imported into the country to the value of 1,050,165 marks, of which 510,636 marks represent the value of the imports from Russia.

WRITING PAPER MILLS.

Among articles of export, those of the writing-paper industry, bark pulp, paste-board and writing paper occupy the third place, coming immediately after forest wares and cattle-breeding products. In 1891, these goods constituted 8.28 per cent of the whole value of all the exports of the country. The writing-paper industry in Finland dates from an early period. Already in the seventeenth century a writing-paper mill had begun its operations in Finland, and in 1760 there were two such mills, in which the bark pulp was pressed by water power, and the form was worked off by hand. The first writing-paper mill furnished with a paper machine was founded in 1842 by the firm J. C. Frenckell and Son at Tammerfors; and between the years 1851 and 1853, a second, the Tervakoski mill, was opened. In 1858 the number of writing-paper mills rose to eight, and the value of their products amounted to 400,000 marks. But the writing-paper industry did not secure its due place till wood began to be used as a raw material in the manufacture of paper. Finland, rich in wood and water, possessed all the materials necessary in the two industries, wood rasping and paper-manufacturing, based, as the latter is, on the employment of the two constituents, bark pulp and cellulose. For this reason, when these two materials began to appear in the market, the writing-paper industry at once acquired an importance in Finland it had never before enjoyed.

The actual development of the paper industry during the last few years is, perhaps, best shown by the number of workmen employed in these paper mills; for, regarding the value of the product, there is an evident disparity in the returns given in by the different factories for the different years, arising from the fact that the bark pulp and cellulose are entered, partly as independent materials, and partly as raw materials for the manufacture of paper, and are therefore not included as separate ingredients in the general estimate of the value of the product. For this reason, the export returns throw light on the development of the paper industry, which has been but little effected by the home demand.

PAPER INDUSTRY.	1884.	1886.	1888.	1890.	1891.
Number of work people	2,197	2,322	2,615	3,300	3,329
Amount of exports in tons . . .	18,527	19,338	25,957	34,548	33,131

In the year 1891, there were at work in the country 13 wood-rasping factories, employing 1,050 workmen, and executing work to the value of 2,741,069 marks; 5 cellulose factories, employing 252 workmen, and executing work to the value of 1,193,973 marks; 11 pasteboard and tarred paper factories, employing 191 hands, and executing work to the value of 950,707 marks; and 11 writing-paper mills, employing 1,836 workpeople, and executing work to the value of 6,897,878 marks.

In 1886 the conditions of the writing-paper export trade underwent a radical change. Up to that date, its products had been exported into Russia free of duty; but from this year a duty of 14 kopecks per poud was laid on bark pulp, and 80 kopecks per poud on all paper of the better sort. These measures, however, did not cause any decrease in the products of this industry, as had been the case in other branches of trade, since, though with no little difficulty, new foreign markets were found for the products of the writing-paper industry. In the mean time, the exports to foreign countries in 1885 amounted in value only to 88,000 marks. But, in 1886, they already reached the sum of 833,406 marks, and in 1887 amounted to no less than 2,328,422 marks. In 1891, 10,984 tons of bark pulp were sent into Russia and 2,039 tons were exported; 14,330 tons of pasteboard, writing-paper, and paper products were exported into Russia, and 5,778 tons were sent abroad. The export abroad of bark pulp for this year forms the maximum to which it has as yet fallen; whilst the export abroad of pasteboard and paper was less than the export in 1888, when it amounted to 7,038 tons.

THE GRAPHIC INDUSTRIES.

The extent to which the typographical industry of a country is developed, serves in some degree, as an index to the level of intelligence to which its people have attained, and at the same time affords evidence of their love for reading. From this point of view, the industry possesses a peculiar interest. The following table refers to the number of printing houses in Finland:

	Year	1886	1888	1890	1891
Number of printing houses . . .		39	42	52	54
Number of work people		699	828	1,021	1,071

It is not possible to estimate with any positive certainty the value of work executed in these establishments. In the year 1891, it was calculated to be 2,203,450 marks, of which sum 503,641 marks represent the value of paper employed. The average number of work people employed in printing houses in 1890 was 1 for every 2,331 inhabitants of the country.

The following table gives the returns for the lithographical industry.

GRAPHIC INDUSTRIES.	1886.	1888.	1890.	1891.
Number of lithographical establishments . . .	5	6	6	6
Value of products reckoned in marks	230,120	347,645	463,546	524,032
Number of work people	174	187	229	234

FOREIGN TRADE.

In reviewing the export trade of Finland, attention must be directed to its foreign trade and also to its trade relations with the Empire. The former has at various periods been influenced by radically divergent considerations; but, speaking generally, the changes it has undergone have up to the present time been mainly directed to the attainment of greater freedom in trade. In the first customs duty tariff, issued in 1812, the different articles allowed to be imported into the country were separately enumerated in a series of a hundred sections, a large number of them being at the same time subjected to a sufficiently high duty. The importation of all other articles was forbidden. The subsequent customs duty tariffs, from 1816 to 1822, were based on a new principle, nearly all articles, save those specially enumerated, being allowed to be imported; though in the last of these tariffs no less than 311 articles were prohibited. These strict prohibitions, of course, resulted in the contraband introduction into the country of the forbidden articles, and the prevalence of smuggling called forth more or less extensive modifications of the tariff, some of these modifications being only temporary, others lasting.

The war in the East, in 1854 and 1855, brought with it many sensible changes in the economic condition of Finland; and these years were marked not only by a complete stagnation in the foreign trade, but by enormous losses sustained by the commercial fleet of the country, which decreased in tonnage by nearly 60 per cent. On the conclusion of peace it, therefore, became absolutely necessary to take energetic measures for restoring the country to its former prosperity. For this purpose, among other measures, different temporary duties were imposed in 1856 on articles of foreign trade, and a new customs duty tariff was issued on April 30, 1859, in which considerable ameliorations were introduced into the system of customhouse protection that had hitherto prevailed. In this tariff all the articles that could be imported free were enumerated in 58 sections, and the duty was further lowered on many articles both of import and export, and with the exception of a few chemical products, the import of only eight of the articles formerly forbidden continued to be prohibited.

The years immediately following brought with them new troubles and calamities to Finland. In 1862 began a series of bad harvests, culminating in 1867 in a complete and dire famine. The cruel effect of these disastrous years on the material development of the country is best characterized by the fact that the population of the country increased during the four years 1860 to 1865 from 1,750,000 to 1,840,000 souls, but in the course of the three following years again fell to 1,736,000 souls. New remedies had to be sought to heal the wounds that had been inflicted on the country. Among the measures adopted with this end in view, was a revision of the customs duty tariff, all the changes made in which had the same tendency as those preceding it. Several duties already imposed were confirmed in the new tariff of 1869, and many important ameliorations were introduced in reference to imports. This tariff in all essential points remains still in force, and the main object of the two subsequent revisions that have been made was to increase and raise the customs dues. The most important change in principle was made in 1886, when the duty on pig-iron, sheet iron, various iron products, and all engines, was further increased. This last measure was taken with a view of protecting the engine-

building and iron foundries of Finland. Lastly, in 1888, the customs duties on certain foodstuffs were raised, particularly the duty on sugar, which was now fixed from 31.20 to 40 marks per 100 kilogram on raw sugar, and from 54.70 marks to 60 marks per 100 kilogram on refined sugar.

All the custom measures just spoken of were confined to imports from abroad; Russian goods, with the exception of sugar, molasses, grape wines, salt and tobacco, being admitted all this time into the country free of duty.

Exports from Finland into Russia had been regulated by special statutes of the tariff of 1812. In 1835 new instructions were issued, by which, for the protection of Russian manufactures and trade, the right of importing goods into Russia was considerably restricted. These instructions remained in force till the years immediately succeeding the war in the East, when, almost simultaneously with the issue of the customs duty tariff for 1859, new rules were drawn up, in virtue of which the right of Finland to import goods into the Empire was in many respects enlarged. These rules remained in force and unchanged for a little more than a quarter of a century, when, in 1885, fresh changes were introduced, in consequence of which the export of iron and iron wares, glass goods, except bottles, and leather, was partly restricted by being limited to a certain quantity each year, and partly by being subjected to a duty.

It has been necessary to give the above short sketch of the customs duty laws, by which the foreign trade of the country is regulated, in order to make the annexed table intelligible. In this table is shown the yearly average value in marks of the imports, exports and trade turnovers.

YEARS.	WHOLE AMOUNT OF IMPORTS INTO FIN- LAND.	PROPOR- TION OF IM- PORT FROM OTHER PARTS OF RUSSIA.	Percentage on whole amount of import from Russia.	WHOLE AMOUNT OF EXPORT FROM FIN- LAND.	PROPOR- TION OF EXPORT TO OTHER PARTS OF RUSSIA.	Percentage on whole amount of export to Russia.	GENERAL EXCHANGE OF FINNISH GOODS.	PROPOR- TION OF EX- CHANGE BETWEEN RUSSIA AND FINLAND.	Percentage on whole exchange of goods between Russia and Finland.
1850—1852.	31,970,000	12,900,000	40	11,720,000	4,170,000	36	43,590,000	17,070,000	39
1856—1857	52,480,000	24,000,000	46	17,280,000	4,230,000	25	69,760,000	28,230,000	40
1867—1869.	68,620,000	34,550,000	50	46,230,000	25,710,000	56	114,850,000	60,260,000	52
1870—1872.	88,500,000	39,000,000	44	61,100,000	32,000,000	52	149,600,000	71,000,000	47
1883—1885.	131,610,000	61,500,000	48	106,970,000	44,090,000	41.3	238,570,000	105,670,000	44.3
1886—1888.	105,490,000	47,130,000	44.7	81,640,000	35,440,000	38.7	187,130,000	76,560,000	42.5
1889 . .	133,480,000	53,700,000	40.2	103,740,000	36,570,000	35.6	236,220,000	90,270,000	38.2
1890 . .	146,600,000	47,260,000	33.7	92,420,080	36,360,000	39.3	233,020,000	83,620,000	35.9
1891 . .	146,530,000	52,460,000	35.8	104,200,000	36,140,000	34.7	250,720,000	88,690,000	35.3

The increased activity in trade that marked the years directly following the conclusion of the war in the East is quite intelligible after the complete stagnation in the foreign trade of the country during the two preceding years. The exchange of goods in the year 1856 to 1857 was, in consequence of this, abnormally high, a proof of which is to be found in the decline of imports from 52,480,000 marks to 40,250,000 marks in the year 1858 to 1859. It would be erroneous to ascribe this great activity in trade solely to the exceptional reduction in the customs duty tariff for 1859. There were other favourable conditions, which gave renewed energy to every branch of public life throughout the country, and which accordingly contributed to a revived activity in trade and commerce. And, perhaps, more than to any thing else, this activity should be ascribed to the greatly increased export of forest materials from the country which marked these years. In this way, then, a still more increased activity in trading operations characterized the years following: and taking the average amount of exports, the total exchange of Finnish goods for 1869 must be reckoned at a figure higher than 100 marks per each inhabitant of the country.

That the Government, notwithstanding the reduction in customhouse dues, gained considerably from this increase in exchange of goods between Finland and Russia, is plain from the subjoined figures.

Y E A R S.	TOTAL CUSTOMS REVENUE IN FINNISH MARKS	PROPORTIONATE PERCENTAGE IN MARKS OF THE TOTAL REVENUE FOR EACH INHABITANT OF THE COUNTRY.
1852	4,900,000	2.9
1862	7,700,000	4.3
1872	8,400,000	4.5
1882	15,300,000	7.2
1891	20,100,000	8.4

Another circumstance well meriting attention is the proportionate relation at different periods between the exchange of Finnish and Russian goods, and the total trade turnover. The customs duty tariff for 1859 of itself caused a considerable increase in the exports to Russia, but simultaneously a corresponding increase in the imports from Russia is to be noticed, so that the sum of trade transactions with Russia for the years 1860 to 1885 fluctuates between 43 and 52 per cent of the total exchange of goods. The changes made in the tariff in 1885 caused a decline in exports, but at the same time a like decline is to be remarked in imports, so that the exchange of goods with Russia is equal to 35.3 per cent of the whole foreign trade of the country for the year 1891.

The following table has been compiled to make clear the position that different kinds of goods occupy in the foreign trade of the country. In it is shown the value of the exports and imports of different important articles of trade in marks, as well as their percentage value in relation to the whole export or import:

I M P O R T.	VALUE IN FINNISH MARKS.	PERCENTAGE.	INCLUDED VALUE IN FINNISH MARKS OF IMPORTS FROM RUSSIA
Grain, flour, and baking products. . .	27,807,000	19	23,914,000
Coffee, and its surrogates	12,641,000	8.6	426,000
Sugar, and sugar products	7,563,000	5.2	1,372,000
Tobacco	2,082,000	1.4	1,108,000
Spirits	4,397,000	3.0	52,000
Hides and skins, with products	6,270,000	4.3	1,654,000
Thread and yarn materials (wool, cotton, flax, etc.).	8,325,000	5.7	1,463,000
Yarn and thread	4,227,000	2.9	1,390,000
Tissues	13,452,000	9.2	6,131,000
Ready-made clothes	4,123,000	2.8	1,739,000
Vegetable oils and fats	4,527,000	3.09	3,193,000
Colours and dyeing articles.	2,224,000	1.5	34,000
Mineral and pottery wares.	5,030,000	3.43	779,000
Metals and metallic wares	13,006,000	8.9	681,000
Machines apparatus.	6,126,000	4.2	87,000
Vessels and boats.	2,472,000	1.7	7,000

E X P O R T.	VALUE IN FINNISH MARKS.	PERCENTAGE.	INCLUDED VALUE IN FINNISH MARKS OF EXPORT FROM RUSSIA.
Cattle	2,060,000	2.0	1,573,000
Cow butter	14,733,000	14.1	2,950,000
Fish, fresh, dried and salted	2,694,000	2.6	2,086,000
Bread and baking products.	7,077,000	6.8	33,000
Hides and skins, with products	2,596,000	2.5	2,258,000
Forest materials and wood products. .	44,784,000	43.0	2,498,000
Bark pulp and writing paper	8,626,000	8.3	6,839,000
Yarn, and tissues	5,182,000	5.0	5,032,000
Pitch, et cetera	2,221,000	2.1	268,000
Stone and pottery wares	2,051,000	2.0	1,993,000
Metals and metallic wares	4,212,000	4.0	4,181,000
Vessels and boats	2,029,000	2.0	1,978,000

From the figures given above it appears that foodstuffs, such as grain, coffee, sugar, tobacco, spirits, make up the principal part of the imports of the country; for, taken altogether, they form in value 42.8 per cent of all the

imports. Next to them, in point of importance, comes the group of dry materials for the production of fibrous fabrics, textile stuffs, yarn and tissues, which constitute in value 20.6 per cent of the whole import. The third place is occupied by metals and metallic wares, machines et cetera, which equal 13.1 per cent, and including vessels, 15.8 per cent.

In value, the first place among exports, immediately after forest and wood materials, is occupied by cattle breeding, agricultural and fish products, amounting altogether to 27.2 per cent. Next come different trade products, among which those of the paper industry equal 8.3 per cent; those of the metal industries, including machines and vessels, equal 6.4 per cent; and those of the textile industries equal 5 per cent.

THE FINNISH CUSTOMS TARIFF.

A general sketch of the historical development of the customs duty tariffs of Finland has already been given in the foregoing section. It has there been shown how, up to the very latest time, all the reforms that have gradually been made in the Finnish customs duty tariffs have constantly had one and the same end in view, to secure greater freedom for the foreign trade of the country, and consequently to diminish the extent of tariff protection of the home trade. Nor has this in any way acted injuriously on the commerce of the country. Notwithstanding the limited extent of this commerce even in the present day, it has none the less quickly developed, as is evident from the foregoing statement, and the progress it has made during the more recent periods is particularly striking; for it is exactly during these periods that it has received the minimum of tariff protection. There is evidently a great difference of opinion in the country as to whether its commerce could attain a still greater development under a more extended system of tariff protection; and the result of the prevailing system has been that the country does not possess sufficient direct experience of the possible effect of protective tariff dues.

None the less, as has been shown above, during the last few years, certain measures have been taken to increase the tariff protection, and in 1886 the duty on various iron wares was considerably raised. Thus, the duty on pig-iron was increased from 0.60 to 1.20 marks per 100 kilograms. The iron industry thereupon increased; but at the same time the amount of imported pig-iron rose to such an extent, that it is very doubtful whether the home trade derived any advantage from the increased duty on it. Up to the year 1886, the engine-building and machine industry of the country was in a very unsatisfactory condition, in consequence of metals and raw materials used in engine-building being subjected to duty, whilst machines and engines were admitted free into the country. This was also changed in 1886, when a duty was laid on engines and machines, and that on various iron wares was raised. There is no doubt that the engine-building industry of the country improved after this, and that from this time its products have essentially increased. But this is by no means the exclusive result of the increased duty, and it is evident from the figures given above that the increase in the importation of engines and other metallic wares has been the result of an increased demand for home purposes and home use.

The changes made in 1888 in the sugar duty have also been mentioned. The difference in the duty on raw and refined sugars formerly amounted to 23.50 marks per 100 kilogrammes; according to the present tariff, it amounts only to 20 marks. On this article, therefore, tariff protection has decreased; and yet, from that very date, the amount of refined sugar prepared in the sugar mills of Finland has each year been greater.

In considering the connection between the customs duty tariff of the country and the development of its industries it must not be forgotten that the trade of Finland does not, in this respect, depend entirely on whether the custom duties on its foreign trade be high or low, since Russian manufactures, with a few rare exceptions, are admitted free into the country. That this rivalry on the part of Russian manufactures exercises a considerable influence on the trade of Finland is evident from the list of imports already given in the table above. That part of the trade of the country, whose products are designed for exportation to Russia, depends also on the measures which at any particular period regulate its exports.

Below will be found certain returns intended to throw light on the actual customs duty tariff of Finland; and it has been thought well to tabulate the figures under different groups of industries, in accordance with the plan already followed in the review given of the trade and commerce of the country.

Metal and engine-building industries. Free of duty: ores, charcoal and coal, vessels above 700 tons, and rails for railroads. Duty per 100 kilograms: pig-iron, 1.20 marks; bar-iron and fine merchant iron, 6.50 to 9.40 marks; sheet iron, 5.30 to 6.50 marks; simple foundry goods and black forge work, 11.80 to 17.60 marks; fine foundry goods and metallic wares, 29.40 to 47.10 marks; nails, 14.70 to 17.60 marks; agricultural and dairy implements, 10.60 to 11.80 marks; machines, 14.70 marks; vessels under 400 tons, 4 per cent, and from 400 to 700 tons 2 per cent of the value.

Tissues and textile fabrics. Free of duty: cotton, flax, hemp. Duty per 100 kilograms: raw silk, 9.40 marks; wool, 3.50 to 7.10 marks; cotton yarn, 45.90 to 70.60 marks; flax and woollen yarn, 58.80 to 70.60 marks; silk yarn, 94.10 marks; cotton stuffs, 117.60 to 305.90 marks; woollen stuffs, 70.60 to 847 marks; flaxen stuffs, 70.60 to 705.90 marks; silk stuffs, 1880 to 4240 marks; dresses, 10 to 20 per cent. besides duty on stuff; stocking goods, 294.10 to 823.50 marks.

Wood industry and wares. Free of duty: forest materials, with the exception of a few costly and veneered woods, carpentry woods, simple wicker and cooper wares. Duty per 100 kilograms: precious woods, such as nutwood, mahogany, et cetera, 0.90 marks; veneered wood, 7.10 marks; toys, 117.60 marks; finer wicker wares, 47.10 marks; joinery and cabinet wares, 4.70 to 58.80 marks.

Chemical products. Free of duty: asphalt, bones and bone dust, manuring materials, tallow, stearine, train oil and other fat substances. Duty per 100 kilograms: alum, 2.40 marks; Chilian saltpetre, 0.90 marks; soda, 1.20 marks; saltpetre, 18.80 marks; muriatic and azotic acids, 2.40 marks; sulphuric acid, 4.70 marks; aniline dyes, 58.50 marks; dye woods 0.90 to 2.80 marks; dye stuffs, 17 to 82.40 marks; polishing varnish, 47.10 to 94.10 marks; fat oils, 11.80 to 35.30 marks; kerosene, 8.20 marks; turpentine, 4.70 marks; glue, 1.80 marks; cosmetic wares,

82.40 to 352.90 marks; candles and unscented soap, 21.20 marks; matches, 32.90 marks.

Foodstuffs. Free of duty: rye, barley, oats, wheat, buckwheat, flour, groats, peas, potatoes, and root chicory. Duty per 100 kilograms: pressed yeast, 12 marks; coffee and chicory, 40 marks; raw sugar, 40 marks; refined sugar, 60 marks; sweet-meats, 100 marks; fruit juices without sugar, 45 marks; raw tobacco in stalks, 40 marks; in leaves, 60 marks; cigars and papiroses, 500 marks; potato flour, 5.90 marks.

Leather industry. Free of duty: raw hides and skins, tan bark and tan extracts, hair and bristles. Duty per 100 kilograms: skins, 47.10 to 117.60 marks; bristle wares, 35.30 to 282.30 marks; boots, shoes, and harness ware, 141.20 marks; gloves, 641.20 marks.

Ceramic wares. Free of duty: cement, lime, gypsum, clays, unwrought stone. Duty per 100 kilogrammes: earthenware and porcelain goods, 11.80 to 141.20 marks; glass and crystal wares, 9.40 to 117.60 marks; pottery wares, 7.10 to 21.20 marks.

Writing-paper products. Free of duty: rags, paper size, bark pulp. Duty per 100 kilograms: tarred paper, 2.40 marks; paper, 41.20 to 176.50 marks; tapestry, 52.90 marks; countinghouse books, 141.20 marks.

HOME WATER WAYS AND RAILROADS.

Finland has been called «the land of a thousand lakes». Of its whole surface, extending to 6,027 geographical square miles, its home waters cover 757 square miles, that is, 11.2 per cent of the whole area. In Sweden, of all European countries the most rich in lakes, next to Finland, its home waters cover 8.2 per cent, in Switzerland 3.1 per cent, in European Russia 1.4 per cent, and in France only 0.3 per cent. These home waters present certain difficulties for navigation. In the lakes there are numerous shallows and rocks, and the rivers are intercepted by a number of rapids; for which reason they are in their natural form fit for navigation only for short distances.

The water systems of the country form five principal groups: the Saima, the Päijäne, the Vest-Tavastländska, the Oesterbotten systems, and lastly, the rivers and waters of the North Frozen Ocean. Only the first four have any great importance as ways of communication.

The Saima water system, the chief basin of which forms the lake Saima, at a level of 76 metres above the sea, flows through the river Wyoksi into the lake of Ladoga. This river abounds in very large rapids, among which may be mentioned the famous Imatra falls, and for that reason is unsuited for navigation. Some centuries ago, the idea was already started of uniting Saima with the bay of Viborg, in the Finnish gulf that runs out into the main land a distance of a little more than 40 kilometres from Saima; which plan was carried out in the middle of the present century, when in 1856 the Saima Canal was finished. This water route, which delights every voyager with its picturesque views, has altogether twenty-eight locks; its construction cost 12,400,000 marks, which sum, not counting the interest on it, had already in 1880 been covered by the net receipts of the passage tolls.

The construction of the Saima Canal involved the execution of different canalization works along the inner parts of the water system, in order to spread the navigable water routes over the largest possible distance within the country. The two principal lines must be separately noticed. The first runs to the town Kuopio, and thence farther on to Iisalmi; it has in its whole length of nearly 400 kilometres, reckoning from the northern extreme of the Saima Canal, Lauritsala, seven locks; and the construction of the line cost 2,600,000 marks, which sum has also been already covered by the net receipts from the passage dues. The second principal line, verging off from the first near the town Nyslott, runs up to the town Joensuu, and thence farther on across the *Pielis elfs kanaler* and the large lake of Pielisjärvi to the small town of Nurmes. This line, counting from the point of divergence from the first, is nearly 300 kilometres in length; it has ten locks in all; and its construction cost about 3,100,000 marks. Including expenses incurred on its different off-routes, the canalization of the Saima water system has up to the present date cost nearly 18,500,000 marks.

The Päijäne water system, named from its chief lake, which is 130 kilometres in length and 78 metres above the sea level, flows through the river Kymmene into the Gulf of Finland. A plan of canalizing this route was drawn up about the year 1860, but as its execution demanded a large capital, and the question of constructing a railroad between Helsingfors and St. Petersburg had already been mooted, the project was abandoned, and in its place the line was laid so as to touch the waters at the small town of Lahtis. By means of some unimportant works, requiring a capital of not more than 75,000 marks, including the construction of two locks, a continuous water route was cut to a length of 150 kilometres, not counting the branch route to the town Heinola. To the north of Päijäne stretches a number of wide lakes; the plan of uniting them with Päijäne has for the present been abandoned, it being intended to run a railroad across the country past the town of Iyväskylä.

The Vest-Tavastländska system, the principal mass of whose waters flows through the river Kumo and falls into the Gulf of Bothnia, has been opened up for communication in the same way as the Päijäne, that is, by bringing the railroad up to it at the towns of Tavastehus and Tammerfors, some canals at the same time having been excavated in the inner portions of the system. These excavations, together with the construction of four locks, cost 1,100,000 marks.

The Österbotten water system is of quite a different character to the three systems already described. Whilst the latter abound in a number of wide lakes, united one to the other by short streams, the lakes in the Österbotten system are comparatively few in number, and it consists rather of rivers, that have no very important basins; but inasmuch as these rivers are constantly intercepted by rapids, they are little fitted for navigation. The Uleä water system, with its principal basin of Uleäträsk, which is at a height of 122 metres above sea level, is the only one like the systems already described. This lake up to the present day has no way of communication either with the sea or with the network of railways. But the river Uleä is so far navigable that large boats can be run along it. A trip down the river in one of the so-called tar boats, thus named from the freightage they usually carry, is an enviable enjoyment for the tourist who desires to experience something new and exciting. With lightning swiftness the boat is carried along the foaming river,

and at times will disappear beneath its waves, only to come up again at a long distance from the spot where it sank. The voyage requires on the part of the steersman not only an accurate knowledge of the rapids, but the greatest care and coolness. One trifling mistake, and the boat, with all its freightage, must be for ever lost. For the sake of rendering the passage safe, sworn steersmen are stationed along the river Uleä. The boats are moved up the rapids by means of large boat hooks, or sometimes by towing ropes, or else are simply dragged up along the bank. The principal work, therefore, in making the Uleä navigable, consisted in constructing good towing paths, and in clearing the rapids of rocks. Along the rivers flowing from an easterly direction into the Uleätrask basin, near the town Kajana, two locks have also been constructed. All the expenses incurred on works connected with the northern Österbotten water system amount to about 500,000 marks. In this way, about 21,000,000 marks have in all been expended in improving the means of communication on the home rivers and streams of the country.

All the railroads of Finland, with the exception of the Borgä line, 33 kilometres in length, at the present day are Government property. This is the result of no previously conceived plan, but has simply arisen from the fact that the construction of railroads in Finland is not sufficiently profitable to be made the object of private enterprise.

The construction of the first railroad in Finland, running between Helsingfors and Tavastehus, a distance of 107 kilometres, was begun in 1858 and completed in 1862. It cost in all 14,694,700 marks, that is to say, 137,300 marks per kilometre. Six years later, in 1868, the construction of the second Finnish line was begun, running from the station Rühimäki, on the first designed line, to St. Petersburg, a distance of 370 kilometres, and costing 27,525,280 marks, that is, 74,700 marks per kilometre. After its completion in 1870, four years elapsed before the commencement in 1874 of the third Finnish line, the Tavastehus-Tammerfors-Åbo line, which was completed in the year 1876. The cost of this line, 208 kilometres in length, amounted to 19,558,906 marks, that is, 94,000 marks per kilometre. In the meanwhile, in the year 1875, the Government purchased the Hangö-Hyvinge line, which belonged to a private company, and the construction of which had been already commenced in 1872. When later the question arose as to the necessity of extending the Finnish railroad system, it was maintained by many that it would be wiser to have recourse to a cheaper mode of construction, which should be more conformable to the small amount of traffic to be relied on in a country like Finland.

In order to arrive at a satisfactory decision on this point, a special commission was appointed. The result of its labours was the expression of an opinion in favour of maintaining the wide gauge of five English feet, decreasing the rate of train-speed, and reducing the expenses of administration on the different lines; besides recommending other like reforms. When, in 1879, the construction of the Wasa railroad was commenced, these suggestions on the part of the commission were put into practice. The result was that, when completed in 1883, the whole cost of its construction over a length of 306 kilometres was found to have been 14,771,832 marks, that is 48,270 marks per kilometre. Since the year 1879, the construction of railroads in Finland has been uninterruptedly continued on the general principles of the plan adopted in constructing the Wasa line.

The following table shows the number of railroads already opened, or being constructed, in Finland.

LINES ALREADY OPENED.	LENGTH IN KILO- METRES	FIRST EX- PENSES OF CONSTRUCTION IN MARKS.	SUPPLEMENTARY EXPENSES OF CONSTRUCTION UP TO 1891 IN FINNISH MARKS.	
			Total sum in marks.	Amount per kilometre.
Helsingfors-Tavastehus-St. Petersburg	508.8	42,219,980	56,605,742	111,244
Hangö-Hyvinge	153.5	—	11,541,004	75,177
Åbo-Tammerfors-Tavastehus	211.6	19,558,906	21,233,847	100,867
Wasa	306.7	15,771,832	16,155,988	52,669
Uleåborg	359.1	19,700,528	20,195,893	56,244
Savolaks	337.7	19,419,293	19,472,641	97,669
Total	1,877.5	126,230,345	145,210,114	77,342
LINES IN COURSE OF CONSTRUCTION:				
Wiborg-Ioensuu	342.5	according to	24,315,000	70,991
Björneborg-Tammerfors.	135.8	estimate ditto	9,660,000	71,156
Total	478.3	—	33,975,000	—

If the length of the railroad system be calculated in proportion to the population of the country, it will be found that for every 1,000 souls there are 0.778 kilometres, and for every 100 square kilometres of the areal surface of the country there are 0.490 kilometres. By a like calculation it will be found, that of the thirty-six towns of the country, with a total population of 226,689 souls, sixteen with a population of 128,476 souls, are provided with railroad communication, the other towns not having any at their disposal.

If again, the whole capital invested on railroad works in Finland be distributed over the whole period from the year 1858 to the end of 1890, it will be found that an average sum of 4,500,000 marks has been annually expended, giving a proportionate sum of 2.25 marks per year for each inhabitant of the country. The whole national debt of the country amounted at the end of 1890 to 82,126,697 marks, of which sum about 7,000,000 was not allotted to railroad works. The capital outlay on railroads during this period consequently exceeded the amount of the national debt by 63,083,317 marks, that is to say, by 72 per cent. The annual outlay in payment of interest and in sinking the national debt amounted in 1891 to 4,942,200 marks; the net receipts of working the lines amounted in the same year to 4,527,583 marks, that is, 3.12 per cent of the capital outlay; the net income thus amounting to 414,617 marks less than the annual amortisement of the whole national debt.

TRAFFIC MOVEMENT ON THE CANALS AND RAILROADS OF FINLAND.

Navigation along the canals in Finland lasted in the year 1890 from 185 to 216 days, the maximum period of navigation being from April 22 up to November 24th. In this same year, 1890, no less than 19,020 vessels passed along the canals; whereas in 1885 their number amounted to 15,740, and in 1881 to 14,990. The returns, from the way in which they are drawn up, do not afford any accurate or definite information either as to the quantity or as to the nature of the freightage conveyed in these vessels along the canals.

In the year 1891, 2,534,899 passengers and 1,033,620 tons of freightage were conveyed along the Government railroads of Finland.

The following table gives the traffic and freightage movement per kilometre on these lines.

RAILWAYS.	Length in kilometres.	NUMBER OF PASSENGER-KILOMETRES.		NUMBER OF FREIGHTAGE-KILOMETRES IN TONS.	
		In all.	Average proportion to kilometres over which the line extends.	In all.	Average proportion to kilometres over which the line extends.
Helsingfors-Tavastehus-St. Petersburg.	509	89,192,432	175,034	69,648,200	136,833
Åbo-Tammerfors-Tavastehus	212	13,953,562	65,819	21,017,673	99,140
Hangö-Hyvinge	154	4,146,144	27,148	7,385,224	47,956
Wasa	307	12,520,514	40,723	10,202,594	33,201
Uleåborg	328	8,007,908	22,306	5,332,898	14,885
Savolaks	338	5,119,691	26,981	5,635,430	16,672
Total . .	1878	136,940,551	72,939	119,222,019	64,120

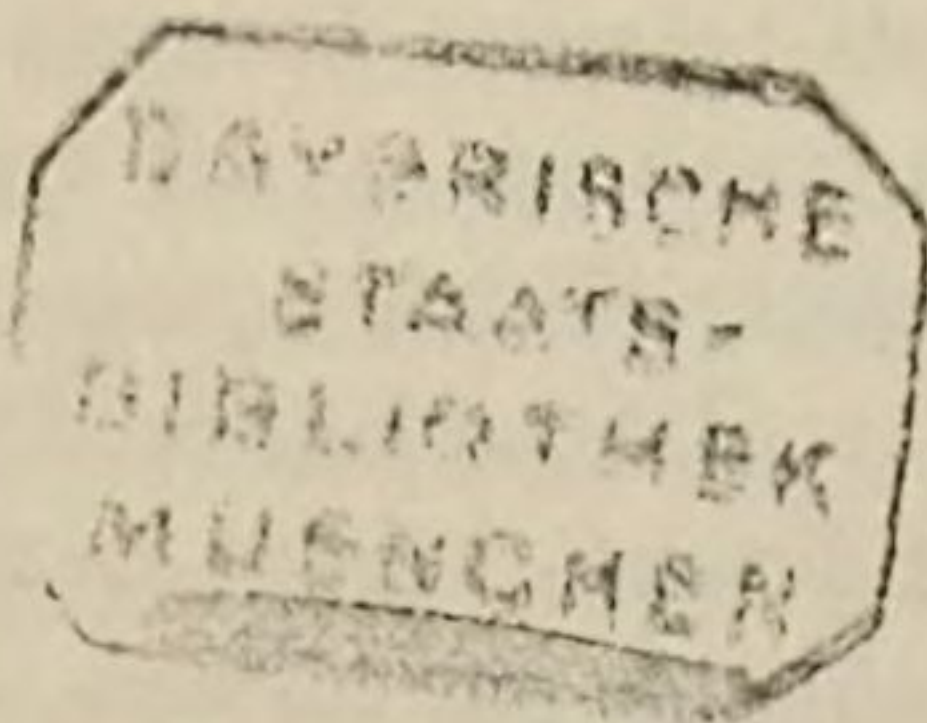
The number of passenger-kilometres and freightage-kilometres, divided in proportion to the number of kilometres over which the line extends, appears to be the surest standard of the intensiveness of the traffic movement. The table shows what an enormous difference there is in this respect between the different sections and branches of the railroad system. The weakest of all appears to be the Uleåborg line, the passenger and goods traffic along which equals one-eighth to one-ninth of the traffic for the same distance on the Helsingfors-St.-Petersburg line.

The relative proportion of the different kinds of freightage is shown in the subjoined figures, in which is set forth the percentage quantity, in tons, of some of the chief products in relation to the whole quantity conveyed:

Forest materials	48.84 per cent.
Stones, clay, bricks, lime, cement	19.17 »
Foodstuffs.	15.51 »
Grain in kernel, in flour, bread	8.33 »
Cattle-breeding products	2.12 »
Trade products, and raw materials for such.	11.07 »
Pasteboard and paper	2.54 »
Iron and other metals	1.43 »
Various goods by the slow and fast trains	5.41 »

The relative proportion in the freightage traffic along different lines is extremely varied. The largest quantity of goods is conveyed to port stations and to St. Petersburg. Thus, of the whole total, amounting to 1,033,620 tons, no less than 721,402 tons are conveyed to these points; whilst only 237,517 tons are carried from them, the remaining 74,719 tons being distributed among the other stations. The winter harbour, Hangö, appears to be the only exception to this rule, 16,137 tons being conveyed to it, whilst 23,835 tons are carried from it.

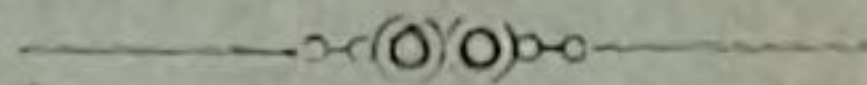
Helsingfors occupies the first place as a trade dépôt and station. The quantity of goods conveyed to and from this city, with its harbour Sörnäs, amounts to 370,645 tons. St. Petersburg comes next with 179,272 tons. With relation to passenger-traffic St. Petersburg occupies preeminently the first place, with its high number of 1,262,872 arrivals and departures, that is, one-half of the passenger traffic on all the other lines put together. The second place falls to the lot of one of the suburban stations, namely Shuvalovo, with its 468,870 passengers. Helsingfors occupies only the third place, with its 312,395 passengers arriving and departing.

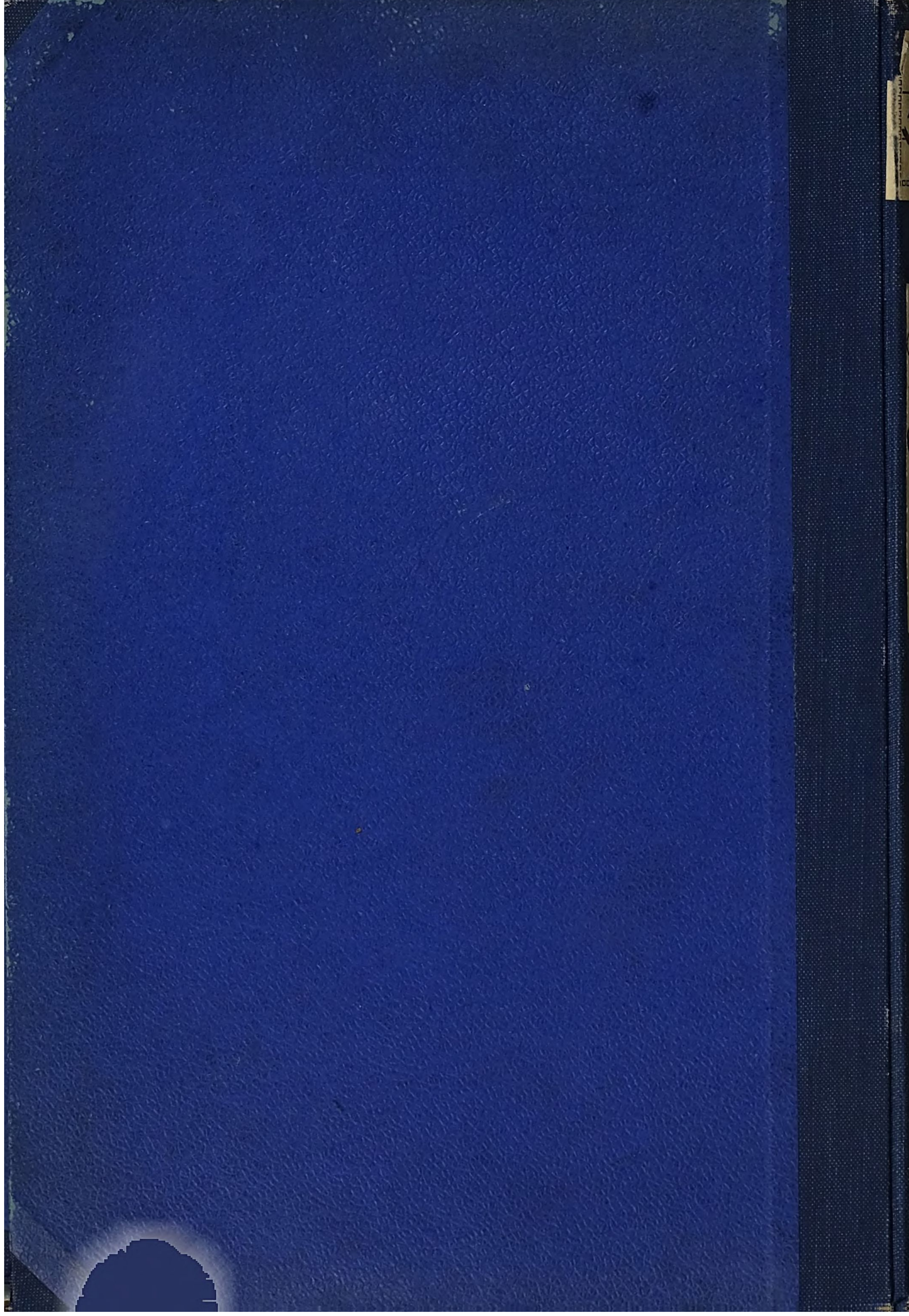


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